



PROPOSED

LIVESTOCK GRAZING MANAGEMENT

for the

COWHEAD- MASSACRE PLANNING UNIT

Final Environmental Impact Statement

United States Department of the Interior
Bureau of Land Management
California



United States Department of the Interior

IN REPLY REFER TO

1792 (Cow/Mas)
(C-020)

BUREAU OF LAND MANAGEMENT

District Office

P. O. Box 1090

Susanville, California

96130

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 85047
Denver, CO 80225-0047

Dear Reviewer:

Enclosed is the final environmental statement (FES) on the Proposed Grazing Management for the Cowhead/Massacre Planning Unit, Susanville District, California.

The Bureau of Land Management has prepared this final environmental statement in partial fulfillment of its responsibilities under the National Environmental Policy Act of 1969, and in accordance with Council on Environmental Quality guidelines. Public comment on and changes to the draft environmental statement based on these comments and additional field work have been incorporated into the FES.

The FES is not the decision document. The decision on the action to be taken will be based on the analysis contained in the FES, BLM's manpower, budget constraints, public concerns and comments, and other multiple use resource objectives or programs applicable to the area. Decisions may be drawn from any one or a combination of the proposed action and eight alternatives.

No action can be taken for at least 30 days following filing of the FES with the Environmental Protection Agency and distribution to the public. A brief summary document that outlines the management direction for the Cowhead/Massacre area will be prepared and made available as soon as decisions are made. More specific decisions will subsequently be developed on an allotment by allotment basis.

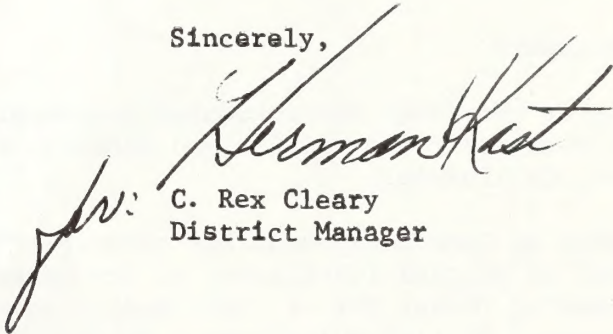


Save Energy and You Serve America!

Many thanks to all those individuals and organizations who provided suggestions and comments on the draft. Your help has been invaluable in preparation of the final environmental statement. Any further comments should be submitted to:

District Manager
Bureau of Land Management
705 Hall Street
P. O. Box 1090
Susanville, CA 96130

Sincerely,

A handwritten signature in dark ink, appearing to read "C. Rex Cleary". The signature is written in a cursive, flowing style. To the left of the signature, there is a small, handwritten mark that looks like "C.R.C." or similar initials.

C. Rex Cleary
District Manager

Enclosure

88013410

SF
85.35
.C2
C68
1980b

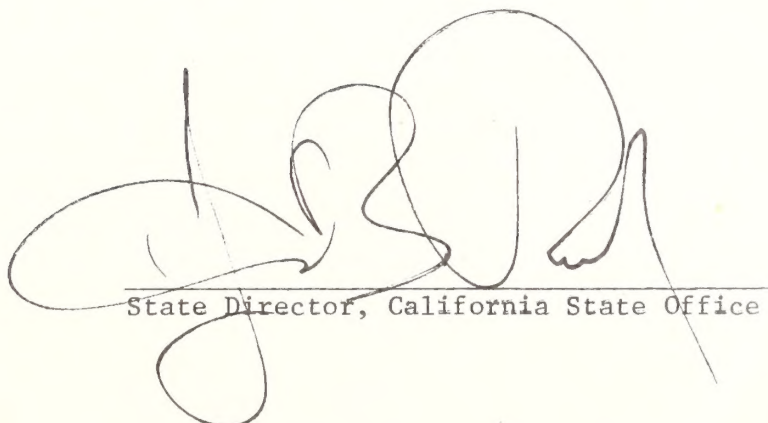
DEPARTMENT OF THE INTERIOR

BLM Library
D-655A, Building 50
Denver Federal Center
P. O. Box 85047
Denver, CO 80225-0047

FINAL ENVIRONMENTAL STATEMENT
PROPOSED DOMESTIC LIVESTOCK
GRAZING PROGRAM
FOR THE
COWHEAD/MASSACRE AREA
CALIFORNIA

Prepared by

BUREAU OF LAND MANAGEMENT
DEPARTMENT OF THE INTERIOR



State Director, California State Office

Bureau of Land Management
Library
Bldg. 50, Denver Federal Center
Denver, CO 80225

Bureau of Land Management
Library
5150, Denver Federal Center
Denver, CO 80225

SUMMARY

() Draft Environmental Statement (X) Final Environmental Statement

Department of the Interior
Bureau of Land Management
California State Office

1. Type of Action: (x) Administrative () Legislative

2. Brief Description of Action

The Bureau of Land Management proposes to implement an improved range management program on public lands within the Cowhead/Massacre Planning Units of the Susanville District in northeastern California and northwestern Nevada. The components of the proposed action are: (1) constraint of livestock grazing use to levels and intensities compatible with other resource values as determined in the BLM planning process (from 59,924 AUM's to 29,711 AUM's); (2) implementation of grazing treatments on 769,000 acres of public land, consisting of no grazing on 97,000 acres, rest-rotation grazing with a light forage use (20-40%) on 237,000 acres, rest-rotation grazing with a moderate forage use (41-60%) on 368,000 acres, fall/winter grazing on 159,000 acres, management in association with private land on 50,000 acres, and periodic (prescribed grazing) grazing use on 23,000 acres. Twenty-one thousand (21,000) acres would be plowed and seeded.

3. Summary of Environmental Impacts

Erosion would decrease due to improved watershed conditions; vegetation would increase in quantity and would improve in quality; terrestrial wildlife habitat would improve and wildlife populations would increase; aquatic and riparian habitat would improve; livestock forage would increase; cultural resource degradation would decrease; recreation opportunities would increase; livestock-related income would decline initially, but would be higher than present levels after 20 years.

Short-term adverse impacts would include reduced vegetative vigor and reproduction due to spring and summer grazing, elimination of some vegetation due to range improvements, severe reduction in the quality of wildlife habitat on 21,000 acres to be plowed and seeded, severe reductions in rancher and area income.

Long-term adverse impacts would include degradation of some archaeological sites by livestock trampling, some streambank deterioration by grazing and trampling, and socio-economic losses as some local ranchers would be unable to continue operating under the proposed action.

4. Alternatives Considered

- (1) Continuation of present management (no action).
- (2) Elimination of livestock grazing.
- (3) Proposed action with economic adjustments.
- (4) Livestock operator management plan.
- (5) Extensive cultural treatments.
- (6) Grazing systems.
- (7) Alternate method for determining stocking levels.
- (8) Optimized non-consumptive use.

5. Comments Have Been Requested From: See attachment.

6. Date Statement Made Available to EPA and the Public

Draft: February, 1980

Final: September, 1980

ATTACHMENT

Comments on the Draft Environmental Statement were requested from the following agencies and interest groups.

FEDERAL

Environmental Protection Agency

Advisory Council on Historic Preservation

U.S. Department of the Interior

Bureau of Mines

Heritage Conservation and Recreation Service

Bureau of Reclamation

U.S. Geological Survey

U.S. Fish and Wildlife Service

Department of Agriculture

Forest Service

Soil Conservation Service

CALIFORNIA - STATE AGENCIES

Office of the Governor

Office of Planning and Research

Historic Preservation Office

The Resources Agency

Department of Conservation

Department of Fish and Game

Department of Parks and Recreation

Department of Water Resources

Air Resources Board

NEVADA - STATE AGENCIES

Conservation and Natural Resources Department

Environmental Protection Division

Parks Division

State Historic Preservation Office

Department of Fish and Game

State Clearinghouse

CALIFORNIA - LOCAL AGENCIES

Lassen and Modoc County Board of Supervisors
Lassen and Modoc County Farm Advisory (Extension Service)
Lassen County Fish, Game and Recreation Commission
Lassen and Modoc County Agricultural Commissioner
Lassen and Modoc County Planning Commissions
Modoc County Farm Bureau
Modoc County Department of Public Works

NEVADA - LOCAL AGENCIES

Washoe County Commissioners
Washoe County Planning and Allocation Committee
Washoe County Parks and Recreation Department
Washoe County Department of Public Works
Washoe County Agriculture Extension Service

OTHER ORGANIZATIONS

Natural Resources Defense Council, Inc.
Sierra Club
California Native Plant Society
California Conservation Council
Scientific Resource Surveys, Inc.
California Natural Resource Federation
Northern California Planning Council
Committee for the Emigrant-Bicentennial National Monument
Nevada State Historical Society
Trails West, Inc.
California Woolgrowers Association
California Cattlemen's Association
American National Cattlemen's Association
Society for Range Management
California Association of 4-WD Clubs, Inc.
Nevada Outdoor Recreation Association, Inc. (NORA)
Nevada Off-Road Vehicle Association
California Off-Road Vehicle Association
National Audubon Society
California Wildlife Federation
Wild Horse Organized Assistance, Inc.
National Wildlife Federation

PURPOSE AND NEED

The purpose of this final environmental impact statement is to assess the impacts to the environment, both natural and social-economic, of the Bureau of Land Management's proposed and alternative range management programs for the Cowhead-Massacre planning unit. This environmental statement seeks to identify, for the layman and the specialist, how the various resources are positively and/or adversely affected by the contemplated actions. Further, this document represents an avenue by which the public and other knowledgeable parties can be further informed of and allowed the opportunity to comment on BLM programs affecting public lands.

The need for this document evolves from the general need to establish programs for improving rangeland condition on our public lands. Establishment of sound range management programs represents a necessary step in maximizing use of all resources. The court judgment in Natural Resource Defense Council vs Morton, et al. (Civil No. 1983-73) clearly mandated that BLM's range management programs meet the Natural Environmental Policy Acts (NEPA) definition of a significant action. This document, then satisfies the need for considering all significant environmental consequences of an array of possible actions before making a final resource management decision.

TABLE OF CONTENTS

	<u>Page</u>
Purpose and Need	viii
Table of Contents	ix
Summary	xxi
 CHAPTER 1--DESCRIPTION OF THE PROPOSED ACTION	
Introduction	1-1
Relationship of the Proposal to the MFP	1-4
Relationship of the Proposal to Wilderness Study	
Area Designation	1-5
Determination of Grazing Capacities	1-5
Subunit 1, High Rock Complex	1-7
Subunit 2, Massacre Mountain/Nut Mountain	1-12
Subunit 3, Long Valley/Sand Creek	1-17
Subunit 4, Mosquito	1-21
Evaluation of Effectiveness of Proposed Management	1-23
 CHAPTER 2--DESCRIPTION OF THE EXISTING ENVIRONMENT	
Data Base	2-1
Air Quality	2-1
Soils	2-1
Water Quality and Supply	2-1
Vegetation	2-1
Livestock Grazing	2-2
Wildlife	2-3
Wild Horses and Burros	2-3
Cultural Resources	2-3
Recreation	2-4
Wilderness	2-4
Social and Economic Conditions	2-7
General Features	2-8
Topography/Geology	2-8
Climate	2-8
Air Quality	2-8
Soils	2-9
Water Quality	2-10
Vegetation	2-13
Threatened and Endangered Plant Species	2-18
Livestock Grazing	2-21
Wildlife	2-33
Wild Horses and Burros	2-41
Cultural Resources	2-44
Recreation	2-60
Wilderness	2-69
Social and Economic Conditions	2-74

Table of Contents (continued)

	<u>Page</u>
CHAPTER 3--IMPACTS OF THE PROPOSED ACTION	
Introduction	3-1
Impacts on Soils and Water	3-1
Impacts on Vegetation	3-8
Impacts on Livestock Grazing	3-19
Impacts on Wildlife	3-20
Impacts on Wild Horses and Burros	3-23
Impacts on Cultural Resources	3-24
Impacts on Recreation	3-26
Wilderness	3-26
Impacts on Social and Economic Conditions	3-27
Subunit 1, High Rock	3-42
Vegetation	3-42
Livestock Grazing	3-43
Wildlife	3-43
Wild Horses and Burros	3-45
Cultural Resources	3-45
Recreation	3-46
Social and Economic Conditions	3-48
Subunit 2, Massacre Mountain/Nut Mountain	3-50
Vegetation	3-50
Livestock Grazing	3-52
Wildlife	3-54
Wild Horses and Burros	3-61
Cultural Resources	3-62
Recreation	3-63
Social and Economic Conditions	3-65
Subunit 3, Long Valley/Sand Creek	3-68
Vegetation	3-68
Livestock Grazing	3-70
Wildlife	3-71
Wild Horses and Burros	3-76
Cultural Resources	3-77
Recreation	3-77
Social and Economic Conditions	3-79
Subunit 4, Mosquito	3-81
Vegetation	3-81
Livestock Grazing	3-82
Wildlife	3-83
Wild Horses and Burros	3-87
Cultural Resources	3-87
Recreation	3-88
Social and Economic Conditions	3-88
 CHAPTER 4--MITIGATION MEASURES	 4-1

Table of Contents (continued)

	<u>Page</u>
CHAPTER 5--UNAVOIDABLE ADVERSE IMPACTS	5-1
CHAPTER 6--RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY	6-1
CHAPTER 7--IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES	7-1
CHAPTER 8--ALTERNATIVES	
Alternative 1, Continue Present Management	8-1
Description	8-1
Impacts	8-1
Soils	8-1
Water	8-3
Vegetation	8-3
Livestock Grazing	8-7
Wildlife	8-9
Wild Horses and Burros	8-10
Cultural Resources	8-10
Recreation	8-10
Social and Economic Conditions	8-11
Mitigation	8-11
Unavoidable Adverse Impacts	8-11
Alternative 2, Elimination of Livestock Grazing	8-13
Description	8-13
Impacts	8-13
Soils	8-13
Water	8-13
Vegetation	8-13
Livestock Grazing	8-16
Wildlife	8-16
Wild Horses and Burros	8-17
Cultural Resources	8-17
Recreation	8-17
Social and Economic Conditions	8-18
Mitigation	8-20
Unavoidable Adverse Impacts	8-20
Alternative 3, Proposed Action with Economic Adjustments	8-21
Description	8-21
Impacts	8-24
Mitigation	8-25
Unavoidable Adverse Impacts	8-25
Alternative 4, Livestock Operator Management Plan	8-26
Description	8-26
Impacts	8-28

Table of Contents (continued)

	<u>Page</u>
Soils	8-28
Water	8-29
Vegetation	8-29
Livestock Grazing	8-34
Wildlife	8-36
Wild Horses and Burros	8-39
Cultural Resources	8-41
Recreation	8-41
Social and Economic Conditions	8-42
Mitigation	8-43
Unavoidable Adverse Impacts	8-43
Alternative 5, Extensive Cultural Treatments	8-44
Description	8-44
Impacts	8-44
Soils	8-44
Water	8-50
Vegetation	8-52
Livestock Grazing	8-56
Wildlife	8-56
Wild Horses and Burros	8-57
Cultural Resources	8-57
Recreation	8-57
Social and Economic Conditions	8-57
Subunit 1, High Rock	8-60
Subunit 2, Massacre Mountain/Nut Mountain	8-61
Subunit 3, Long Valley/Sand Creek	8-67
Subunit 4, Mosquito	8-69
Mitigation	8-72
Unavoidable Adverse Impacts	8-72
Alternative 6, Grazing Systems	8-73
Description	8-73
Impacts	8-81
Soils	8-81
Water	8-81
Vegetation	8-81
Livestock Grazing	8-84
Wildlife	8-84
Wild Horses and Burros	8-84
Cultural Resources	8-84
Recreation	8-86
Social and Economic Conditions	8-86
Subunit 1, High Rock	8-88
Subunit 2, Massacre Mountain/Nut Mountain	8-90
Subunit 3, Long Valley/Sand Creek	8-96
Subunit 4, Mosquito	8-97
Mitigation	8-100
Unavoidable Adverse Impacts	8-101

Table of Contents (continued)

	<u>Page</u>
Alternative 7, Alternative Method for Determining Stocking Levels	8-102
Description	8-102
Impacts	8-108
Soils	8-108
Water	8-108
Vegetation	8-108
Livestock Grazing	8-113
Wildlife	8-115
Wild Horses and Burros	8-115
Cultural Resources	8-117
Recreation	8-118
Social and Economic Conditions	8-118
Subunit 1, High Rock	8-119
Subunit 2, Massacre Mountain/Nut Mountain	8-122
Subunit 3, Long Valley/Sand Creek	8-126
Subunit 4, Mosquito	8-129
Mitigation	8-133
Unavoidable Adverse Impacts	8-134
Alternative 8, Optimized Non-Consumptive Use	8-135
Description	8-135
Impacts	8-135
Soils	8-135
Water	8-135
Vegetation	8-135
Livestock Grazing	8-137
Wildlife	8-137
Wild Horses and Burros	8-139
Cultural Resources	8-139
Recreation	8-141
Social and Economic Conditions	8-141
Mitigation	8-147
Unavoidable Adverse Impacts	8-147
 CHAPTER 9--CONSULTATION AND COORDINATION WITH OTHERS	 9-1
 GLOSSARY	 GL-1
 REFERENCES CITED	 R-1

Table of Contents (continued)

	<u>Page</u>
 APPENDICES	
Appendix A, Livestock Carrying Capacity and Stocking Rates	A-1
Appendix B, Vegetative Condition and Trend Studies	B-1
Appendix C, Ecological Site Characteristics	C-1
Appendix D, Small Mammals and Nongame Birds Associated with Specific Habitat Types	D-1
Appendix E, Determination of Relative Wildlife Values	E-1
Appendix F, Cultural Resource Surveys: Objectives Methods, Results	F-1
Appendix G, Operator Dependency on Public Lands in the Cowhead/Massacre Planning Unit	G-1
Appendix H, Ecological Sites for Estimating Erosion	H-1
Appendix I, Impact of Soil/Water Relations	I-1
Appendix J, Anticipated Response of Ecological Sites Under the Proposed Action	J-1
Appendix K, Browse Condition Standards	K-1
Appendix L, Stream Surveys	L-1
Appendix M, Comments Considered During EIS Preparation	M-1

LIST OF PREPARERS	LOP-1
-------------------	-------

MAPS

<u>No.</u>	<u>Title</u>	
1-1	General Location	1-2
1-2	Land Ownership	1-3
1-3	High Rock Subunit	1-10
1-4	Massacre/Nut Mountain Subunit	1-13
1-5	Long Valley/Sand Creek Subunit	1-18
1-6	Mosquito Subunit	1-22
2-1	Major Vegetation Associations	2-15
2-2	Existing Allotments	2-23
2-3	Deer Range	2-34
2-4	Antelope and Sage Grouse Range	2-35
2-5	Wild Horses	2-42
2-6	Cultural Resources Surveys	2-45
2-7	Recreational Use Areas	2-65
2-8	Hunting and Sightseeing	2-66
2-9	Visual Resources	2-70
2-10	Scenic Quality Areas	2-71
2-11	Proposed Wilderness Study Areas	2-78

Table of Contents (continued)

		<u>Page</u>
MAPS (continued)		
<u>No.</u>	<u>Title</u>	
3-1	Subunit and Management Area Boundaries for the Proposed Action	3-2
4-1	Land Treatment Guidelines	4-4
8-1	Subunit and Management Area Boundaries for Alternative 6	8-74
8-2	Subunit and Management Area Boundaries for Alternative 7	8-103

TABLES

<u>No.</u>	<u>Title</u>	
Summary Table-1	Soils/Water Impact Summary	xxiii
Summary Table-2	Vegetative Impact Summary	xxv
Summary Table-3	Livestock Grazing Impact Summary	xxvii
Summary Table-4	Wildlife Impact Summary	xxix
Summary Table-5	Wild Horse and Burro Summary	xxxiii
Summary Table-6	Cultural Resources Impact Summary	xxxvi
Summary Table-7	Recreation, Visual, Wilderness Resources Impact Summary	xxxix
Summary Table-8	Socio-Economic Impact Summary	xli
Summary Table-9	Achievement of Land Use Goals	xlv
1-1	Unit Forage Consumption Summary	1-6
1-2	Example of Allowable Livestock Use Calculation	1-8
1-3	Livestock Carrying Capacity and Use: Present, Proposed, and Future	1-9
1-4	Forage Consumption Summary (AUM's/Yr.) Subunit 1, High Rock	1-11
1-5	Subunit 2, Proposed Action: Massacre Mountain/ Nut Mountain	1-15
1-6	Forage Consumption Summary (AUM's) Subunit 2, Massacre Mountain/Nut Mountain	1-16
1-7	Subunit 3, Proposed Action: Long Valley/ Sand Creek	1-19
1-8	Forage Consumption Summary (AUM's/Yr.) Subunit 3, Long Valley/Sand Creek	1-20
1-9	Subunit 4, Proposed Action: Mosquito	1-24
1-10	Forage Consumption Summary (AUM's/Yr.) Subunit 4, Mosquito	1-25
1-11	Relationship of Grazing Proposal to Land Use Planning	1-30

Table of Contents (continued)

		<u>Page</u>
TABLES (continued)		
<u>No.</u>	<u>Title</u>	
2-1	PSIAC Classification of Sediment Yield	2-11
2-2	Erosion Rates in Cowhead/Massacre Planning Unit	2-11
2-3	Calculated Erosion by Ecological Site	2-12
2-4	Ecological Sites of the Cowhead/Massacre Area	2-14
2-5	Condition and Trend of Browse Transects	2-17
2-6	Existing Livestock Forage Production	2-19
2-7	Surprise Valley Ranches-Crop Acreages (1974)	2-22
2-8	Livestock Use - Subunit 1, High Rock	2-24
2-9	Existing and Proposed Grazing Management Summary	2-25
2-10	Livestock Use - Subunit 2, Massacre Mountain/ Nut Mountain	2-29
2-11	Livestock Use - Subunit 3, Long Valley/Sand Creek	2-31
2-12	Livestock Use - Subunit 4, Mosquito	2-32
2-13	Estimated Wildlife Values by Management Area	2-40
2-14	Wild Horses and Burros in the Study Area	2-43
2-15	Distribution of Known and Predicted Archaeological Sites by Subunit	2-46
2-16	Sites of <u>National Register</u> Quality, Subunit 1, High Rock	2-53
2-17	Known and Predicted Archaeological Sites, Subunit 2, Massacre Mountain/Nut Mountain	2-54
2-18	Sites of <u>National Register</u> Quality, Subunit 2, Massacre Mountain/Nut Mountain	2-55
2-19	Known and Predicted Archaeological Sites, Subunit 3, Long Valley/Sand Creek	2-58
2-20	Sites of <u>National Register</u> Quality, Subunit 3, Long Valley/Sand Creek	2-59
2-21	Known and Predicted Archaeological Sites, Subunit 4, Mosquito	2-61
2-22	Sites of <u>National Register</u> Quality, Subunit 4, Mosquito	2-62
2-23	Estimated Recreational Use, Cowhead/Massacre Planning Unit 1976, 1980, 1990	2-64
2-24	Projected Estimated Population, Surprise Valley 1970-1990	2-76
2-25	Employment by Industry, Cowhead/Massacre Planning Area (1977)	2-77
2-26	Break-Even Feeder Beef Prices, Modoc County	2-80
2-27	Importance of Planning Unit Forage on a Regional Basis	2-81
2-28	Operator Dependency by Management Area	2-82
2-29	Economic Importance of Management Areas Ranked by Rancher Dependency	2-88

Table of Contents (continued)

Page

TABLES (continued)

<u>No.</u>	<u>Title</u>	
3-1	Comparison of Present and Future (20 Year) Erosion Rates (Tons/Ac./Yr.)	3-4
3-2	Estimated Soil Loss (Tons/Acre/Year)	3-6
3-3	Suspended Sediment in Runoff Water (mg/l)	3-7
3-4	Vegetative condition in 20 Years with the Proposed Action	3-13
3-5	Twenty Year Change in Range Condition with the Proposed Action	3-14
3-6	Vegetation Disturbed through Construction of Water Facilities and Fences	3-15
3-7	Initial Forage Production with the Proposed Action	3-17
3-8	Forage Production in 20 Years with the Proposed Action	3-18
3-9	Areas Potentially Affected by Combining Present Allotments into Common Allotments	3-30
3-10	Net Revenues After Payment of Annual Cash Costs - Present Situation and Under the Proposal - 500 Cow Operation	3-32
3-11	Changes in Actual Use Under the Proposal by Operator	3-34
3-12	Livestock Use by Management Area Existing, Proposed, and Projected Use After 20 Years	3-38
3-13	Indirect Economic Impacts on the Planning Unit's Resources	3-40
3-14	Impacts on Recreation, Subunit 1, High Rock	3-47
3-15	Impacts on Recreation, Subunit 2, Massacre Mountain/Nut Mountain	3-64
3-16	Chance of Accumulated Snowfall	3-72
3-17	Impacts on Recreation Resources in Subunit 3, Long Valley/Sand Creek	3-78
3-18	Impacts on Recreation Resources in Subunit 4, Mosquito	3-89
4-1	Mitigation of Land Treatment Impacts	4-3
4-2	Management Prescriptions Based on Habitat Types	4-5
6-1	Summary of Trade-Offs: Short-Term vs. Long Term Productivity	6-2
8-1	Forage Allocation Summary, Alternative 1	8-2
8-2	Range Condition in 20 Years with Alternative 7	8-4
8-3	Vegetative Condition in 20 Years with Alternative 1	8-6

Table of Contents (continued)

		<u>Page</u>
TABLES (continued)		
<u>No.</u>	<u>Title</u>	
8-4	Vegetative Production with Alternative 1	8-8
8-5	Forage Allocation Summary, Alternative 2	8-14
8-6	Net Revenues After Payment of Annual Cash Costs - Present Situation and Under the No Grazing Alternative - 500 Cow Operation	8-19
8-7	Projected Annual Compensation to Operators for AUM Reductions	8-23
8-8	Forage Allocation Summary, Alternative 4	8-27
8-9	Damage to Range Plant Species from Late Summer Burning	8-31
8-10	2,4-D Residues in Forage Grasses at Several Time Periods Following Application	8-32
8-11	Residue Levels of 2,4-D Following Feeding at Two Levels	8-35
8-12	Chronic Toxicity of 2,4-D	8-35
8-13	Wild Horse and Burro Numbers	8-40
8-14	Forage Allocation Summary, Alternative 5	8-45
8-15	Proposed Management for Alternative 5, Subunit 2, Massacre Mountain/Nut Mountain	8-46
8-16	Proposed Management for Alternative 5, Subunit 3, Long Valley/Sand Creek	8-47
8-17	Proposed Management for Alternative 5, Subunit 4, Mosquito	8-48
8-18	Values Used for Soil and Water Parameters Calculation During Three Year Period of Seedling Establishment	8-49
8-19	Soil Erosion Losses Caused by Vegetative Establishment in Management Areas	8-51
8-20	Range Condition in 20 Years with Alternative 5	8-53
8-21	Vegetative Condition in 20 Years with Alternative 5	8-54
8-22	Livestock Forage Production, Alternative 5	8-55
8-23	Present and Proposed Use by Operator, Alternative 5	8-58
8-24	Proposed Management for Alternative 6, Subunit 1, High Rock	8-75
8-25	Proposed Management for Alternative 6, Subunit 2, Massacre Mountain/Nut Mountain	8-76
8-26	Proposed Management for Alternative 6, Subunit 3, Long Valley/Sand Creek	8-78
8-27	Proposed Management for Alternative 6, Subunit 4, Mosquito	8-79

Table of Contents (continued)

<u>No.</u>	<u>Title</u>	<u>Page</u>
TABLES (continued)		
8-28	Forage Allocation Summary for Alternative 6	8-80
8-29	Range Condition in 20 Years with Alternative 6	8-82
8-30	Vegetative Condition in 20 Years with Alternative 6	8-83
8-31	Livestock Forage Production, Alternative 6	8-85
8-32	Present and Proposed Livestock Use Under Alternative 6 by Operator	8-87
8-33	Proposed Management for Alternative 7, Subunit 1, High Rock	8-104
8-34	Proposed Management for Alternative 7, Subunit 2, Massacre Mountain/Nut Mountain	8-105
8-35	Proposed Management for Alternative 7, Subunit 3, Long Valley/Sand Creek	8-106
8-36	Proposed Management for Alternative 7, Subunit 4, Mosquito	8-107
8-37	Forage Allocation Summary for Alternative 7	8-109
8-38	Range Condition in 20 Years with Alternative 7	8-110
8-39	Vegetative Condition in 20 Years with Alternative 7	8-111
8-40	Livestock Forage Production	8-114
8-41	Wild Horses and Burros	8-116
8-42	Present and Proposed Use by Operator, Alternative 7	8-120
8-43	Forage Consumption Summary, Alternative 8	8-136
8-44	Wild Horses and Burros	8-140
8-45	Present Use and Use Under Alternative 8, by Operator	8-142

FIGURES

<u>No.</u>	<u>Title</u>	
2-1	Class A (high quality) Scenery - High Rock Canyon	2-72
2-2	Pioneer Inscription on High Rock Canyon Wall Along Lassen/Applegate Emigrant Trail	2-72
2-3	Class B Scenery (moderate quality)	2-73
2-4	Class C Scenery (poor quality)	2-73
8-1	Difference Between 1978 Licensed Use and 20-Year Projected Use (In AUM's)	8-22

SUMMARY

Introduction

This final environmental impact statement examines impacts of a proposed action and eight grazing management alternatives that would affect 1,094,000 acres of land in northwestern Nevada and northeastern California, 769,000 acres of which are public lands administered by the Bureau of Land Management.

Objectives

The major objective is to improve range condition in a manner which compliments the various activities which occur in the area.

Resources

The area is dominated by sagebrush vegetative communities. Most of the area is in poor/fair ecological range condition. Environmentally sensitive types such as aspen stands, meadows, riparian areas, wetlands, and browse stands are in poor condition. Trend in range condition is stable except on environmentally sensitive areas, where trend is downward.

Wildlife is highly diverse, including deer, antelope, sage grouse, chukar, nongame birds, and numerous raptor nesting sites. Fish and wildlife habitat are generally degraded and in poor condition with downward trends.

Over 20,000 archaeological sites have been predicted. There are 40 known cultural resources of National Register quality.

Recreational use centers around wildlife and archaeological values. Over 34,000 visitor days occur annually, including sightseeing, rock-hounding, and hunting.

No designated or proposed wilderness areas exist within the planning area. However, 6 areas totalling 272,485 acres are identified as potential wilderness (WSA). Wilderness suitability studies will be conducted on the areas prior to October, 1991.

The area is rancher/farmer dominated. Cedarville is the nearest social/economic center with a population of about 750.

Thirty-four permittees have some level of dependency on grazing on public lands in the Cowhead/Massacre Study Area. The study area contributes 4.0 percent of Modoc County's gross livestock sales, although the economic stability of most of these operations depend upon forage utilized on these public lands.

PROPOSED ACTION AND ALTERNATIVES (AS MITIGATED)

The study area was divided into four subunits based on geographic, topographic, and general resource similarities. These units are: (1) High Rock, (2) Massacre/Nut Mountain, (3) Long Valley, and (4) Mosquito. Land use goals were set and recommendations made for each sub-unit.

PROPOSED ACTION

The proposed action proposes elimination of grazing in High Rock to maintain and enhance various primitive, scenic, and wildlife values. The proposed management for the Massacre/Nut Mountain sub-unit emphasizes wildlife and calls for a 65 percent overall reduction in livestock grazing. The proposals for Long Valley and Mosquito sub-units identify livestock as a dominant use and the objective here is to enhance the livestock grazing opportunities. Systematic grazing is proposed with an initial 15 percent reduction in livestock use.

ALTERNATIVES

Eight alternative courses of action are provided:

Alternative 1-Continue Present Management: This would perpetuate current management practices assuming no changes in livestock use, pattern of use, or season of use over a 20 year period.

Alternative 2-Elimination of Livestock Grazing: No livestock grazing would be allowed on public lands.

Alternative 3-Proposed Action with Economic Adjustments: Included are all components of the proposed action plus economic compensation for seven years to those ranchers facing a reduction in AUMs on the public lands.

Alternative 4-Livestock Operator Management Plan: Developed to meet the concerns of the Cowhead/ Massacre operators, this alternative is similar to Alternative 1 in that no initial adjustments to stocking levels or season of use are proposed. It differs in that it emphasizes a monitoring system to identify particular grazing systems which might be necessary, and it emphasizes selected range improvements (seeding, spraying, burning and water development).

Alternative 5-Extensive Cultural Treatments: This alternative proposes large capital investments to improve range condition coupled with changes in season of use and established patterns of use by livestock operators. These disruptions would be offset by a moderate increase in permitted use (23 percent).

Alternative 6-Grazing Systems: Optional grazing systems are evaluated along with coordinated plans with the Sheldon Antelope Refuge and the U.S. Fish and Wildlife Service.

Alternative 7-Alternative Method for Determining Stocking Levels: This alternative emphasizes minimizing economic disruption to livestock operators while still effecting a large degree of range improvement. A large scale of range treatments is proposed. A different formula than for the proposed action and related alternatives is used to determine stocking levels.

Alternative 8-Optimized Non-Consumptive Use: All elements are identical to the proposed action except that lower stocking levels are proposed for the Long Valley and Mosquito sub-units.

SUMMARY OF IMPACTS AS MITIGATED

A summary of the impacts of the proposed action and various alternatives is presented in the coming tables (SUMMARY TABLES 1-8). Following the impact summary tables is a tabular representation of the degree to which the various alternatives and proposed action meet the adopted land use goals for the study area (SUMMARY TABLE 9).

SUMMARY TABLE 1
SOILS/WATER IMPACT SUMMARY

Area of Impact	Unit of Measure	Existing Environment	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvement	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method for Determining Stocking Levels	Alternative 8 Optimized Non-Consumptive Use
<u>Soil</u>											
Soil Erosion	Tons/Acre/Year	769,000 acre.	59% of acres would have adequate cover to prevent accelerated soil erosion. 41% of the area would be subject to slight or moderate erosion.	10% of the area would have adequate cover to prevent accelerated soil erosion. 31% would be subject to slight or moderate erosion. 59% would be subject to more severe erosion.	All areas would have adequate cover to prevent accelerated soil erosion after 20 years.	Same as Proposed Action.	Erosion depending on development, same as in Alternative 1.	Within 15-20 years this alternative should control erosion as effectively as Alternative 2.	Erosion depending on development, same as in Alternative 5.	Erosion depending on development, same in Alternative 2.	Same as proposed action.
<u>Water Resources</u>											
Storm Runoff	Percent change	Ø	Initiation of management systems could reduce runoff up to 20-30%.	No Change from existing situation.	Total effect 10-15% decrease in runoff.	Same as Proposed Action.	No Change from existing situation.	Total effect 10% decrease in runoff.	Same as Alternative 5.	Total effect 10% to 20% decrease in runoff.	Same as proposed action.
Water Quality	Percent change	Ø	Water quality will improve as runoff & erosion decrease. Estimated 50-60% decrease in sediment.	No change from existing situation.	Estimated 33-45% decrease in sediment.	Same as Proposed Action.	No change from existing situation.	Estimated 20-30% decrease in sediment.	Same as Alternative 5.	Estimated 30-50% decrease in sediment.	Same as proposed action.

SUMMARY TABLE 2
VEGETATIVE IMPACT SUMMARY

Area of Impact	Unit of Measure	Existing Environment	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvement	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method for Determining Stocking Levels	Alternative 8 Optimized Non-Consumptive Use
Range Condition	Acres	Poor - 403,000 Fair - 437,000 Good - 6,000 Excellent - 0	P - 33,000 F - 321,000 G - 442,000 E - 500	P - 389,000 F - 430,000 G - 27,000 E - 0	P - 171,000 F - 235,000 G - 438,000 E - 2,000	P - 33,000 F - 321,000 G - 442,000 E - 500	P - 373,000 F - 409,000 G - 64,000 E - 0	P - 281,500 F - 196,000 G - 369,000 E - 500	P - 67,500 F - 363,000 G - 363,000 E - 400	P - 76,000 F - 331,000 G - 416,000 E - 400	P - 33,000 F - 321,000 G - 442,000 E - 500
Forage Production	AUMs	60,800	186,000	52,000	176,000	186,000	60,000	123,000	159,000	149,000	186,000
Range Improvement	Acres	Unsatisfactory range condition.	High degree of range improvement throughout the study area.	Moderate degree of improvement on Area 2C and 4B which are covered by existing AMPs. The remainder of the study area would remain in near present condition except for livestock concentration areas (i.e., meadows) which would decrease in condition.	High degree of range improvement on most of the study area. Areas with very sparse vegetative understory would show little improvement. Increased horse use will limit improvement of some sites in sub-units 1 & 2.	The degree of improvement would be the same as for the proposed action.	Range improvement would be similar to Alternative 1. Exceptions would be Sub-unit 1 and areas which are seeded sprayed, or burned. These areas (73,400 acres) would improve in condition.	Sub-Unit 1 & grazing exclusions would show a high degree of improvement. Areas 3A, 3B, & 4A, would remain in existing conditions. Sub-unit 2 and Areas 4B and 4C would show moderate improvement. Sprayed, burned, & seeded areas (120,000 acres) would respond similar to that described in Alternative 4.	The east side of High Rock, Area 3A, 3B, 4B, North Nut Mountain, & 4C would show a high degree of improvement. The west side of High Rock, Areas 2B, 2C, 2D, 2E, & the AMP portion of 4B would show moderate improvement. Areas 2A & 4A are not expected to improve significantly.	Significant range improvement would occur on the East Side of High Rock Canyon, Grazing Exclusion areas, Fall grazing areas, and on areas with three & four treatment grazing systems. Moderate improvement would occur on areas with two treatment grazing systems. Sprayed burned and seeded areas (91,500 acres) would improve condition.	Nearly identical to the proposed action. The rate of improvement would be faster in areas 3A, 4B & 4C.

* For comparison purposes, figures do not include acreages for Area 4A or miscellaneous acres.

SUMMARY TABLE 3
LIVESTOCK GRAZING IMPACT SUMMARY

Area of Impact	Unit of Measure	Existing Environment	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvement	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method for Determining Stocking Levels	Alternative 8 Optimized Non-Consumptive Use
Initial Active AUMs	AUMs	56,730	34,273	56,730	0	34,273	54,150	69,059	51,108	45,624-69,436*	31,551
Estimated in 20 yrs.	AUMs		96,000	61,000	0	96,000	69,000	82,000	99,000	106,000	79,000
Livestock Performance		Reduced performance & weight gains during initial cycle of grazing systems; long-term improvements in animal nutrition, cow/calf weights & overall livestock performance; increased herding & livestock disturbance in areas combining livestock herds.		Short-term improvement in performance due to water developments and reduced trailing requirements; 5-10% increase expected over 5-10 year period; weight gain in the long-term would return to near existing level.	All livestock eliminated.	Same as Proposed Action.	Short-term improvement. Weight gain and performance increases due to new range facilities; in long-term livestock performance would return to near existing levels.	Short-term decrease in performance on new grazing system areas; short-term improvement in areas with water improvements and vegetation manipulation; increased herding & livestock disturbance on areas that combine several livestock herds; slight improvement in livestock performance in the long-term.	Slight short-term increase in performance, but increase in weight gains in long-term due to improvement in animal nutrition; increased cow/calf performance expected in long-term; where cattle use is eliminated sheep performance would increase.	Same as Proposed Action. *45,624 year 1. 58,053 year 2-4. 69,436 year 5.	Nearly identical to the proposed action. Livestock performance in areas 3A, 4B, & 4C would be slightly better.

SUMMARY TABLE 4
WILDLIFE IMPACT SUMMARY

Area of Impact	Unit of Measure	Existing Environment	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvement	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method for Determining Stocking Levels	Alternative 8 Optimized Non-Consumptive Use
Deer	Spring & summer habitat.	Poor/downward.	Great improvement.	Continued downward trend.	Moderate improvement	Same as Proposed Action.	Continued downward trend.	Moderate improvement.	Moderate improvement.	Moderate improvement.	Great improvement.
	Fall & winter habitat.	Poor/downward.	Moderate browse improvement.	Accelerated downward trend.	Great improvement.	Same as Proposed Action.	Continued downward trend.	Moderate improvement.	Moderate improvement.	Slight improvement.	Great browse improvement.
	Fawning areas.	Poor condition.	Improved cover.	Continued poor condition.	Great improvement.	Same as Proposed Action.	Continued poor condition.	Moderate improvement.	Moderate improvement.	Moderate improvement.	Improved cover.
	Numbers (Reasonable numbers=2300)	1,800 increasing slightly.	Moderate increase to 2,450	Fluctuating near current levels.	Moderate increase to 2,450	Same as Proposed action.	No significant change.	Slight improvement to 2,000.	Moderate increase to 2,310.	Moderate increase to 2,400.	Very great increase to 2,565.
Antelope	Spring & summer habitat.	Fair-heavy forb competition.	Great improvement.	Continued deterioration.	Moderate improvement.	Same as Proposed Action.	Continued deterioration.	Moderate improvement.	Moderate improvement.	Moderate improvement.	Great improvement.
	Fall & winter habitat.	Fair-heavy browse competition.	Great improvement.	Deterioration.	Moderate improvement	Same as Proposed Action.	Slight deterioration.	Slight improvement.	Moderate improvement.	Moderate improvement.	Great improvement.
	Kidding areas.	Fair.	Great improvement.	Severe deterioration.	Great improvement.	Same as Proposed Action.	Severe deterioration.	Moderate improvement.	Moderate improvement.	Moderate improvement.	Great improvement.
	Numbers (Reasonable numbers=1800)	1,200 increasing moderately.	Very great increase to 2,500	Static.	Great long-term increase to 2,200.	Same as Proposed Action.	Moderate increase to 1500.	Moderate improvement to 2,170.	Great increase to 2,300.	Great increase to 2,300.	Very great increase to 2,635.
Bighorn Sheep	Potential for transplant.	Poor	Excellent	Poor	Excellent	Same as Proposed action.	Good-as mitigated.	Excellent	Good as Mitigated	Fair as mitigated	Excellent
Quail	Habitat.	Poor condition scattered small areas.	Slight improvement.	Continued decline (elimination of population).	Great (expanded range).	Same as Proposed Action.	Continued decline.	Slight improvement.	Continued deterioration.	Slight improvement.	Slight improvement.
Water-fowl	Nesting habitat.	Poor.	Slight improvement.	No change.	Great improvement.	Same as Proposed Action.	No change	No change.	Slight improvement.	Slight improvement.	Slight improvement.

SUMMARY TABLE 4 (Continued)

Area of Impact	Unit of Measure	Existing Environment	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvement	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method for Determining Stocking Levels	Alternative 8 Optimized Non-Consumptive Use
Sage-grouse	Nesting habitat.	320,000 acres satisfactory.	Moderate improvement.	Continued deterioration.	Great improvement.	Same as Proposed Action.	Continued deterioration.	Moderate improvement.	Moderate improvement.	Moderate improvement.	Moderate improvement.
	Brood rearing habitat.	1,000 acres poor condition.	Great improvement.	Continued deterioration.	Moderate improvement.	Same as Proposed Action.	Continued deterioration.	Moderate improvement.	Slight improvement.	Moderate improvement.	Great improvement.
	Wintering habitat.	Satisfactory.	Moderate improvement.	Little change.	Moderate improvement.	Same as Proposed Action.	No significant change.	No significant change.	No change.	No change.	Moderate improvement.
	Numbers	10,000.	Moderate increase	Slow, continual decline.	Moderate increase.	Same as Proposed Action.	Slow, continual decline.	Slight to moderate increase.	Slight increase.	Slight increase.	Moderate increase.
Nongame Species	Habitat.	Structural diversity reduced.	Moderate improvement.	Continued disturbance.	Great improvement & increase in diversity.	Same as Proposed Action.	Continued disturbance.	Variable slight deterioration overall.	Variable generally improved.	Slight to great improvement depending on site.	Moderate improvement.
	Species Richness.	Moderate & variable.	Moderate increases	Slight decrease.	Moderate increase.	Same as Proposed Action.	Variable.	Variable.	Slight to moderate increase.	Slight to moderate increases.	Moderate increases in general Great localized increases.
	Density	Moderate & variable.	Variable increases	Slight to moderate decrease.	Variable increase.	Same as Proposed Action.	Variable.	Slight decline overall.	Variable overall increase.	Variable	Variable increases.
								No significant change.	Slight to moderate improvement.	Slight improvement.	Slight to moderate improvement.
Raptors	Food supply.	Satisfactory.	Slight improvement.	Slight to moderate decrease.	Moderate improvement.	Same as Proposed Action.	No significant change.	Moderate improvement.	Continued deterioration.	Continued deterioration on most; improvement on Sand Creek.	Great improvement.
Fisheries	Aquatic habitat.	Limited & in poor condition.	Moderate to high improvement.	Continued degradation.	Great improvement.	Same as Proposed Action.	Continued deterioration.	—			

SUMMARY TABLE 5
WILD HORSE AND BURRO SUMMARY

Area of Impact	Unit of Measure	Existing Environment	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvement	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method for Determining Stocking Levels	Alternative 8 Optimized Non-Consumptive Use
Wild Horse and Burro											
High Rock	Acre	89,020	100% reduction in in horses & burros. (277 horses). (2 burros).	Maintain current levels & impact habitat.	100% reduction in numbers.	Same as Proposed Action.	As in Proposed Action.	100% reduction	100% horse reduction.	100% horse reduction.	Same as proposed action.
Massacre/ Nut Mountain	Acre	Total acres 268,000									
Mgmt. Area 2A			Maintain current numbers (50).	Maintain current numbers.	100% reduction.	Same as Proposed Action.	Reduce horses from 50 to 14.	100% reduction	Reduce horses from 50 to 28.	Reduce horses from 50 to 14.	Increase horses from 50 to 113.
Mgmt. Area 2B			Maintain current numbers (48).	Maintain current numbers.	100% reduction.	Same as Proposed Action.	Reduce horses from 48 to 12.	100% reduction	Reduce horses from 48 to 25.	Reduce horses from 48 to 12	Increase horses from 48 to 108.
Mgmt. Area 2C			Reduce horses from 58 to 29.	Maintain current numbers.	100% reduction.	Same as Proposed Action.	Reduce horses from 58 to 21.	100% reduction	Reduce horses from 58 to 44.	Reduce horses from 58 to 21.	Increase horses from 58 to 131.
Mgmt. Area 2E			Reduce horses from 212 to 106.	Maintain current numbers.	100% reduction.	Same as Proposed Action.	Reduce horses from 212 to 51.	100% reduction	Reduce horses from 212 to 104.	Reduce horses from 212 to 51.	Increase horses from 212 to 478.
Long Valley/ Sand Creek	Acre	Total acres 300,000									
Mgmt. Area 3A			Maintain current numbers (31).	Maintain current numbers.	100% reduction.	Same as Proposed Action.	Reduce horses from 31 to 10.	100% reduction	Reduce horses from 31 to 20.	Reduce horses from 31 to 10.	Increase horses from 31 to 162.

SUMMARY TABLE 5 (Continued)

Area of Impact	Unit of Measure	Existing Environment	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvement	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method for Determining Stocking Levels	Alternative 8 Optimized Non-Consumptive Use
Wild Horse and Burro											
Mosquito	Acre	Total acres 277,000									
Mgmt. Area 4A			Remove all horses (9).	Maintain current numbers.	100% reduction	Same as Proposed Action.	Reduce horses from 9 to 3.	Increase horses from 9 to 11.	Reduce horses from 9 to 7.	100% horse reduction. (9 horses).	Increase horses from 9 to 53.
Mgmt. Area 4B			Increase horses from 20 to 32.	Maintain current numbers.	100% reduction	Same as Proposed Action.	Increase horses from 20 to 23.	Increase horses from 20 to 79.	Increase horses from 20 to 47.	Increase horses from 20 to 23.	Increase horses from 20 to 105.

SUMMARY TABLE 6
CULTURAL RESOURCES IMPACT SUMMARY

Area of Impact	Unit of Measure	Existing Environment	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvement	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method for Determining Stocking Levels	Alternative 8 Optimized Non-Consumptive Use
Cultural Resources	Effects +, -, Ø/# of sites.	20,000 sites (public & private)	+: 3,400 Ø: 2,200 -: 13,400	Ø: 20,000	-: 20,000	+: 3,400 Ø: 2,200 -: 13,400	Ø: 20,000	+: 14,000 Ø: 3,900 -: 2,100	Ø: 16,700 -: 3,300	+: 13,200 Ø: 4,600 -: 1,200	+: 3,400 Ø: 2,200 -: 13,400

+: Increase in adverse effects from present situation.

Ø: No significant change from present situation.

-: Decrease in adverse impacts from present situation.

SUMMARY TABLE 7
RECREATION, VISUAL RESOURCES IMPACT SUMMARY

Area of Impact	Unit of Measure	Existing Environment	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progredivse Range Improvement	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method of Determining Stocking Levels	Alternative 8 Optimized Non-Consumptive Use
Recreation	+, -, Ø	769,000	Significant + impact on hunting. Slight - impact on recreational access to meadows, springs, & other fenced areas.	Overall impact on recreational opportunities would be Ø. Increase in use of riparian, meadows, & aspen areas as camp-sites would occur. Hunting opportunities would continue to correspond to existing fluctuations in game populations.	Slight + impact on recreation. Quality of campsite areas near water would increase. Some + increase in hunting opportunities.	Same as Proposed Action.	Overall impact Ø. Similar to Alternative 1.	Significant + impact on hunting. Slight - impact on recreational access to meadows, springs & other fenced areas.	Similar to Proposed Action except positive impacts to High Rock not as great. Very + significant hunting opportunities created in Wall Canyon and North Nut Mountain Allotments.	Similar to Alternative 5 except that sheep grazing will continue east of High Rock Canyon.	Same as Proposed Action.
Visual Resources	+, -, Ø		Impacts + on overall aesthetic appeal due to upward trend in range condition and protection of those areas with existing high aesthetic appeal, particularly High Rock Sub-Unit.	Impact on aesthetic quality basically Ø.	Similar + impacts to High Rock as with proposed action. Very slight + improvement due to improvements in range condition.	Same as Proposed Action.	Range improvements would have a moderate - impact on existing aesthetic values.	Most significant - impact on aesthetics of all alternatives. Large scale cultural treatments will create numerous visual contrasts.	Similar to Proposed Action except positive impacts on High Rock Area not as great.	Similar to Alternative 5 except that positive impacts to High Rock Area would not be as great.	Same As Proposed Action.
Wilderness*			High positive impact due to elimination of grazing in Sub-Unit 1. Low to med. positive impact in other Subunits due to decreases in livestock activity.	Low to moderate negative impact due to continuation of grazing & of existing stock improvements.	High positive impact, due to improvement of other resources and elimination of visual intrusions from livestock operations.	Same as Proposed Action.	Moderate negative impact due to increases in numbers of livestock developments.	High positive impacts due to elimination of grazing in Subunit 1. Moderate negative impacts in other Subunits due to many additional developments, land treatments, and increased livestock grazing.	Moderate positive impact in Subunit 1 due to elimination of grazing on east side of High Rock Canyon. Low negative impacts elsewhere due to continued grazing with additional developments.	Moderate positive impact in Subunit 1 due to significant decreases in livestock grazing. Moderate negative impact elsewhere due to increased grazing with additional developments.	Same as Proposed Action, except for slightly more positive impacts on the Sheldon contiguous WSA in Subunit 4 due to light rather than moderate utilization limits.

+: Increase in adverse effects from present situation.

Ø: No significant change from present situation.

-: Decrease in adverse impacts from present situation.

*: Impacts on wilderness are assessed according to the level of grazing activity proposed within WSA's its impact on vegetation, water quality, soils wild horses, and burros, wildlife populations, scenic quality and archaeological sites.

SUMMARY TABLE 8

SOCIO-ECONOMIC IMPACT SUMMARY

Area of Impact	Unit of Measure	Existing Environment	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvement	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method of Determining Stocking Levels	Alternative 8 Optimized Non-Consumptive Use
Economics											
Initial Active AUMs	AUMs	56,730	39,970	56,730	0	39,970	54,150	69,059	51,108	1st year: 58,230 2nd year Onward: 70,959	32,621
Potential Change in Permittees Gross Annual Livestock Sales ^{a/}	\$	0	-\$240,000	No Change	-1,709,000	-240,000	-35,000	+380,000	-65,000	+315,000	-\$334,000
Possible Number of Induced Bankruptcies	Livestock Operators	0	0-20	0	0-27	0-6	0	0-25	0-2	0-1	0-20
BLM Costs of Construction.	\$	\$0	\$1,665,000	Discounted @ 6½% equals \$214,500. @ 12% = \$147,500.	b/	\$1,665,000	\$1,584,000	\$3,590,000	\$2,581,000	\$2,405,000	\$1,665,000

a/ These are the potential extremes in livestock sales changes. Reductions sales assume the permittees reduce their herds to a degree commensurate with the various proposed cuts in licensed grazing. Increases in sales assume that the ranchers are able to adjust their seasonal feed balances to the point of being capable of utilizing the increases in licensed use.

b/ Alternative 2's costs associated with fence removal enforcement of the no-grazing policy, and permittee costs for fencing of private lands cannot be assessed at the ES level of analysis.

SUMMARY TABLE 8
SOCIO-ECONOMIC IMPACT SUMMARY (continued)

Area of Impact	Unit of Measure	Existing Environment	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvement	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method for Determining Stocking Levels	Alternative 8 Optimized Non-Consumptive Use
Discounted Maintainance Costs over 20 Year Life Project ^{a/}											
a. Borne by BLM at 6½%	\$	N/A	\$205,800	\$133,025 ^{b/}	-	\$978,100	\$294,500	\$332,500	\$332,500	\$294,500	\$205,800
b. Borne by Permittees at 6½%	\$	N/A	\$409,500	-	-	\$409,500	\$552,500	\$589,500	\$464,000	\$552,300	\$409,500
c. Borne by BLM at 12%	\$	N/A	\$129,500	\$72,424 ^{b/}	-	\$862,500	\$190,500	\$201,000	\$210,500	\$190,500	\$129,500
d. Borne by Permittees at 12%	\$	N/A	\$281,000	-	-	\$281,000	\$379,000	\$404,500	\$318,000	\$379,000	\$281,000

^{a/} These are the maintenance costs associated solely with the proposal on the ground improvements.

^{b/} The mixture of springs, wells, and reservoirs are unspecified hence the monetary assignment of maintenance costs between BLM and the permittees cannot be made.

SUMMARY TABLES 9
ACHIEVEMENT OF LAND USE GOALS

Land Use Goals	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvements	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method for Determining Stocking Levels	Alternative 8 Optimized Non- Consumptive Use
Maintains primitive values and scenic resources in High Rock.	Meets objective.	Continuation of grazing & attendant water maintenance activities would compromise existing values. Does not meet objective.	Meets objective.	Meets objective	Similar to Alternative 1.	Meets objective.	Meets objectives on east side of High Rock Canyon.	Meets objective.	Meets objective.
Increase carrying capacity by 40,000 AUMs in 20 years.	Meets objective/ (125,200 AUMs)	Does not meet objective. (4,000 AUMs).	Meets objective. (115,200 AUMs)	Meets objective. (125,200 AUMs)	Does not meet objective. (12,000 AUMs)	Meets objective (63,000 AUMs)	Meets objective (93,000 AUMs)	Meets objective (88,200 AUMs)	Meets objective (125,200 AUMs)
Raise average condition class from "poor/fair" to "good" by 1998 (615,000 ² acres).	Does not meet objective. High improvement with 442,000 acres in good condition.	Does not meet objective. Marginal improvement, 27,000 acres in good condition.	Does not meet objective. High improvement with 438,000 acres in good condition.	Same as proposed action.	Does not meet objective Slight improvement, 64,000 acres in good condition.	Does not meet objective. Moderate improvement, 319,000 acres in good condition.	Does not meet objective. Moderate improvement, 363,000 acres in good condition.	Does not meet objective. Moderate/high improvement, 416,000 acres in good condition.	Does not meet objective. High improvement, 442,000 acres in good condition.
Provide forage for 2,300 deer (4,700 AUMs) & 1,800 antelope (2,800 AUMs) or reasonable numbers as agreed upon by BLM & Nevada Dept. of Fish & Game.	Increase in deer to 2,450. Increase in antelope to 2,500. Exceeds objective of reasonable numbers.	Numbers would fluctuate near existing levels. Objective not met.	Moderate increase in deer to 2,450, antelope to 2,200. Reasonable numbers objective exceeded for deer & antelope.	Same as proposed action.	Same as for Alternative 1 (Continue present management.)	Increase in deer to 2,000, antelope to 2,170. Objective not met for deer, exceeded for antelope.	Increase in deer to 2,310, antelope to 2,300. Objective met for deer, exceeded for antelope.	Increase in deer to 2,400, antelope to 2,300. Objective met for deer, exceeded for antelope.	Increase in deer to 2,565. Increase in antelope to 2,635. Exceeds objective of reasonable numbers.
Protect and maintain approx. 267 wild horses.	Meets objective	Maintains existing levels (705). Exceeds objective.	Removes all horses Does not meet objective.	Same as proposed action. Meets objective.	Maintains population of approx. 140 horses Does not meet objective.	Reduce numbers to approx. 90. Does not meet objective.	Increase numbers to approx. 290. Meets objective.	Decrease numbers to about 140. Does not meet objective.	Same as proposed action. Meets objective.

SUMMARY TABLE 9 (Continued)
ACHIEVEMENT OF LAND USE GOALS

Land Use Goals	Proposed Action	Alternative 1 Continue Present Mgmt. (No Action)	Alternative 2 No Livestock Grazing	Alternative 3 Proposed Action With Economic Adjustments	Alternative 4 Rancher Developed Progressive Range Improvements	Alternative 5 Extensive Seeding, Burning & Spraying	Alternative 6 Grazing Systems	Alternative 7 Method for Determining Stocking Levels	Alternative 8 Optimized Non- Consumptive Use
Provide intensified management facilities to support individual management plans on most allotments by 1984.	Meets objective assuming adequate funding.	Meets objective assuming adequate funding.	N/A	Meets objective assuming adequate funding.	Meets objective assuming adequate funding.	Meets objective assuming adequate funding.	Meets objective assuming adequate funding.	Meets objective assuming adequate funding.	Meets objective assuming adequate funding.
Improve 10.0 mi. of stream habitat to excellent condition by 1990.	High improvement. Would meet objective on most subject areas.	Continued degradation. Does not meet objective.	Great improvement. Meets objective.	Same as proposed action.	Continued deterioration. Does not meet objective.	Moderate improvement but would not meet total objective.	Meets objective as mitigated.	Meets objective as mitigated.	Great improvement. Objective met.
Protect archaeological & historical resources	Meets objective as mitigated.	Meets objective as mitigated.	Meets objective.	Meets objective as mitigated.	Meets objective as mitigated.	Meets objective as mitigated.	Meets objective as mitigated.	Meets objective as mitigated,	Meets objective as mitigated.

CHAPTER 1

PROPOSED ACTION

Chapter 1

DESCRIPTION OF THE PROPOSED ACTION

INTRODUCTION

The proposed action is designed to meet land-use goals in the Cowhead/Massacre Planning Unit through implementation of a grazing management program (including no grazing) on those lands within the planning unit. Water facilities, fences and seedings are included in the plan to support both land-use goals and the intensified livestock management systems proposed for those lands.

Cowhead/Massacre lies in northeastern California and northwestern Nevada and is administered by the Bureau of Land Management (BLM), Susanville District, as a single unit of nearly contiguous character and ownership (MAP 1-1).

Within the unit, land ownership is as follows:

Public Lands	769,000 acres
Private Lands	315,000 acres
State Lands	10,000 acres
TOTAL	1,094,000 acres

The whole 1.09 million acres are subject to the influence of the proposed action on the public land (769,000 acres).

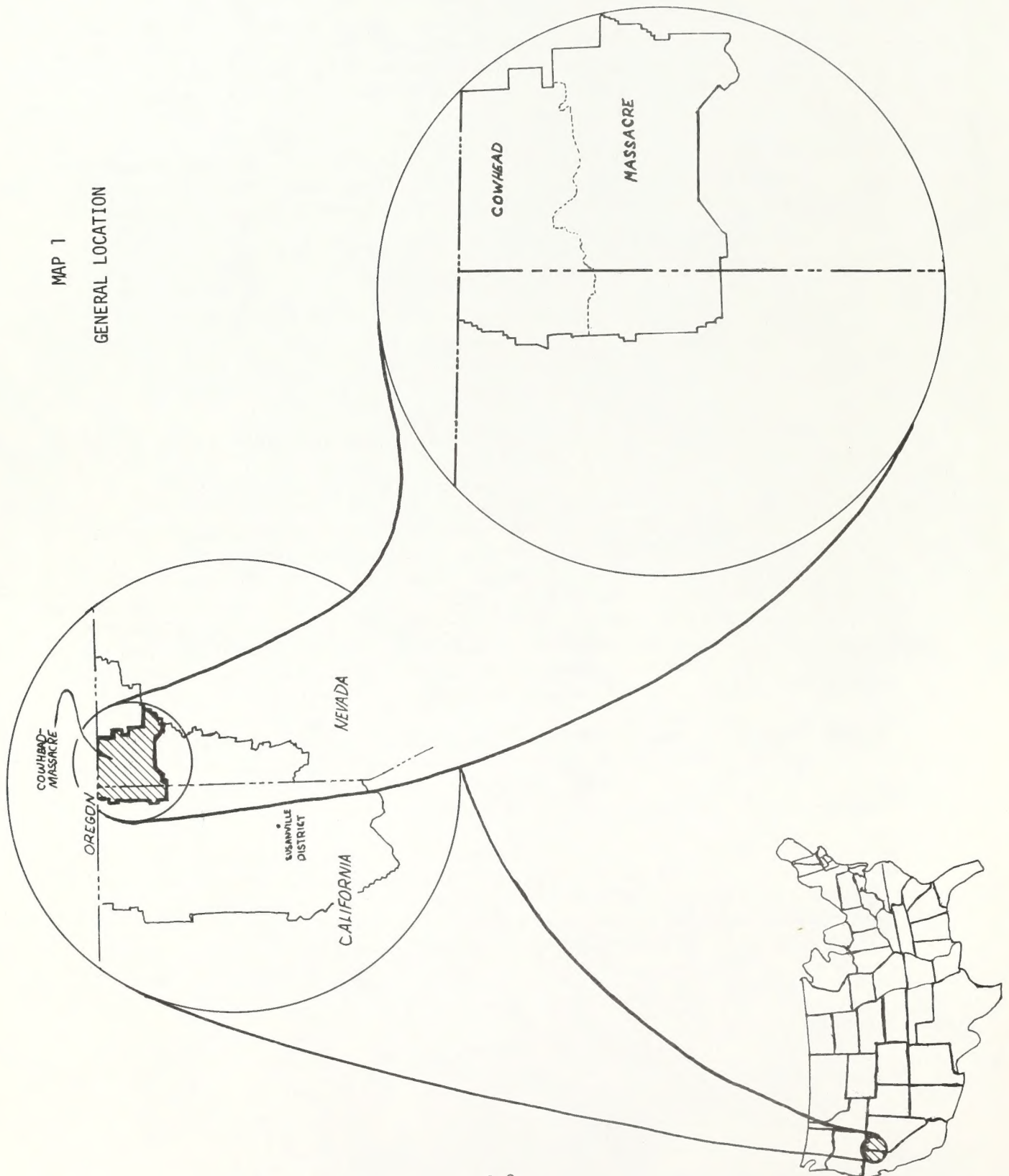
Cowhead/Massacre has been divided into four sub-units: High Rock (No. 1); Massacre Mountain/Nut Mountain (No. 2); Long Valley/Sand Creek (No. 3); and Mosquito (No. 4). Division of the planning unit into sub-units allows land-use planning on an areal basis (MAP 1-2). Resources and their uses in each of the four sub-units were examined and land-management goals and priorities for resolution of resource conflicts were developed, based on relative resource values, BLM policy, public interest, and social/economic factors. Management proposals for each sub-unit are further described later in this chapter.

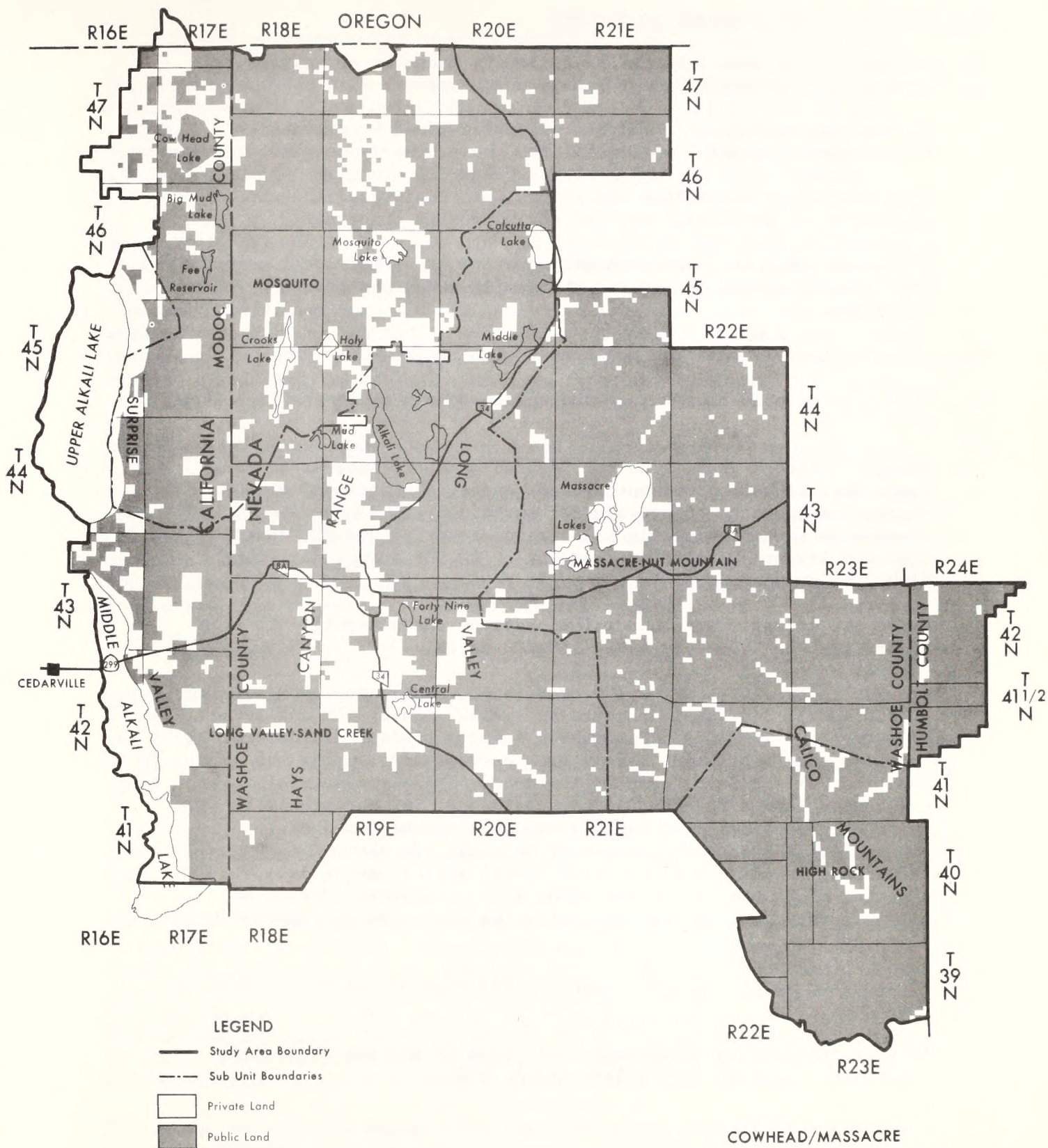
Implementation of the proposed action would entail preparation of allotment management plans (AMPs) or other activity plans in appropriate areas. At this time, present allotment boundaries (MAP 2-2) would be redrawn to address the specific management needs of this proposal.

The proposed action may combine operators into common allotments in five of the eleven management areas. Although final determination of these combinations will not be made until AMPs are prepared, Tables 1-5, 1-7, and 1-9 indicate the areas potentially affected by a combination of allotments, and the number of ranchers and cows involved.

MAP 1

GENERAL LOCATION





Relationship of the Proposal to the MFP

The proposed action must achieve the following land-use objectives, as set forth in the Cowhead/Massacre Management Framework Plan (MFP):

- Improve the ecological condition of public lands by preventing destructive uses and by providing for their orderly use and improvement.
- Give special consideration and priority to the protection and Management of areas with special environmental concern.
- Stabilize the social and economic environment of the local community with special consideration for the family owned and operated ranch lifestyle.

The following overall planning goals must also be met:

- Maintain the primitive values and scenic resources in the High Rock area.
- Manage livestock grazing in the Cowhead/Massacre area at a level compatible with other resource needs and at the capacity of the vegetative resource to provide for sustained yield/use without changes in livestock use in all but the severest drought years. Increase livestock carrying capacity by 40,000 animal unit months (AUMs) in 20 years.
- Raise the average range condition class of the planning unit from "poor/fair" to "good" by 1998 (615,000 acres).
- Provide forage for about 2,300 deer (4,700 AUMs) and 1,800 antelope (2,800 AUMs), reasonable numbers as agreed upon by BLM and Nevada Department of Wildlife. Reasonable numbers of deer are determined by projecting population levels from harvest data, using the modified Selleck-Hart formula (Tsukamoto, 1977) and averaging the population levels for the 15-year period of 1961 through 1975. The average is considered to be a "reasonable number" of deer to manage for. Reasonable numbers of antelope are determined by projecting population levels from annual aerial census data, assuming 50-55 percent of the population is observed during an aerial survey, and further expanding the estimated populations by 50 percent.
- Protect and maintain a population of 267 wild horses in the Cowhead/Massacre area.
- Provide intensified management facilities to support individual management plans on most allotments by 1984.

- Improve 10.0 miles of stream habitat to excellent condition by 1990.
- Protect archaeological and historic resources as required by law.

The relationship of this grazing management proposal to other resource management needs is shown by sub-unit in TABLE 1-11 at the end of this chapter. Comparison of livestock grazing recommendations from the BLM planning process are made with conflicting land-use recommendations to allow analysis of resulting resource conflicts and recommend conflict resolutions which led to the present proposed action.

The grazing management systems proposed here are derived from a comparison of land-use goals, existing range condition and trend, and existing grazing use. Land-use goals established for each sub-unit constrain livestock grazing within each sub-unit to a balanced use of all the natural resources of the unit, including: archaeological and historical resources, wildlife, wilderness, wild horses, and livestock. Grazing use was eliminated, restricted, or freed from current restriction where such action would help reach these goals.

Relationship of the Proposed Action to Wilderness Study Area Designation

The Wilderness Intensive Inventory phase identified four Wilderness Study Areas (WSA's) within the planning area. Seven additional roadless areas are still being reviewed for WSA status. A final wilderness inventory decision on these 7 units will not be made until November, 1980. All areas not cleared from wilderness review must be managed under BLM interim management guidelines to protect their wilderness values.

PROPOSED ACTION

Determination of Grazing Capacities

The chief concern in this reassessment of resource capability was limitation of livestock utilization in areas of overuse, thus reducing impacts upon the range resource and other resources.

TABLE 1-1 summarizes present and proposed forage consumption in the planning unit. Estimated carrying capacity for livestock and wild horses is 66,838 AUMs.

The DEIS estimated carrying capacity at 47,325 AUMs; this has been changed to 66,838 AUMs in the FES. Two factors led to this substantial change. First, the procedure used to calculate the 47,325 AUM figure contained an error. Secondly, during the 1979 grazing extensive field work provided utilization and actual use records for both livestock and wild horses. Utilization and actual use provided the basis for calculation of a carrying capacity, which is based upon field collected data rather than estimates from generalized range site descriptions.

The change in carrying capacity has been reflected throughout the document. The major changes based upon the new carrying capacity information included a higher stocking rate in the proposed action (39,970 AUMs up from 34,273 AUMs), higher initial stocking rates in Alternatives 3 and 8 and higher initial forage production levels in the proposed action and the alternatives.

Grazing capacities for allotments in Cowhead/Massacre were determined by range surveys in 1963. Grazing use was adjudicated between 1965 and 1968 resulting in recommended reductions of 20-73 percent in stocking rates. Adjudication resulted in the present licensed use of 56,730 AUMs though grazing capacity was calculated at 49,675 AUMs.

Range condition and tend surveys by the BLM in 1977 indicate the ranges are in poor condition and have improved little since 1963. However utilization studies conducted in 1979 show most allotments not exceeding moderate utilization which indicates that systematic rather than continuous grazing may be required to bring about range improvement.

The 1979 utilization levels indicate 39,970 AUMs unit-wide as the probable maximum livestock grazing level that can be initially sustained on native ranges while still permitting all resource needs to be met and improvement of the range to "good" condition by 1998 (TABLE 1-1).

TABLE 1-2 is an example of how allowable livestock use was calculated. The example is a four-pasture grazing system where two pastures are grazed and two pastures are rested each year, where utilization is reduced from moderate (60 percent) to light (30 percent) use, where grazing turnout dates are delayed until June 15.

Licensed livestock use, livestock carrying capacity, and proposed livestock use after 20 years are compared in TABLE 1-3. TABLE 2-9 shows, by allotment and management area, the present and proposed management and kind of livestock. APPENDIX A describes the methodology used to determine livestock carrying capacity.

Detailed descriptions of components of the proposed action as they apply to each sub-unit follow. Included are a brief description of land-use goals for the sub-unit; the priority used in each case for resolving resource management conflicts; grazing management proposals; and rationale for selection of the management proposals.

Sub-Unit 1, High Rock Complex

High Rock Complex (89,020 acres) is shown on MAP 1-3.

Land Use Goals

- (1) Maintain High Rock Complex in a primitive state by preservation of the natural characteristics of the area.
- (2) Preserve 1,953 archaeological sites, 12 historical sites, and 16 miles of the Lassen/Applegate Trail.
- (3) Provide wildlife habitat in suitable condition for bighorn sheep, 100+ species of nongame wildlife, 650 antelope, and 125 deer.

The following priority was used to resolve resource management conflicts: archaeological and historic resources, wildlife, wilderness, recreation, livestock, wild horses.

The summary of large-mammal forage consumption for the sub-unit is shown in TABLE 1-4.

TABLE 1-1

UNIT FORAGE CONSUMPTION SUMMARY
(in AUMs)

	<u>Existing</u>	<u>Proposed</u>
Livestock	56,730*	39,970 <u>1/</u>
Wild Horses	10,386	4,734
Antelope ^{2/}	1,741	3,634
Deer ^{2/}	3,705	5,085
Bighorn Sheep	0	240
TOTAL	72,562	53,663

* Present Active Preference

1/ Includes 5200 AUM's from seedings.

2/ Represents actual quantity of livestock AUMs allocated for big game use. Due to dietary differences, the quality of forage for big game may be the limiting factor on populations. Actual use may therefore be less than the allocation.

TABLE 1-2

EXAMPLE OF ALLOWABLE LIVESTOCK USE CALCULATION

Current Use:	20,000 AUMs
Current Utilization:	60%
Rest 50% of the area:	20,000 AUMs
	<u>x 50%</u>
	10,000 AUMs
Reduce use by 50% to achieve 30% utilization:	10,000 AUMs
	<u>x 50%</u>
	5,000 AUMs
Later turnout dates will increase forage volume by 28%	5,000 AUMs
	<u>+ 28% increase</u>
	6,400 AUMs of use
Proposed Use:	6,400 AUMs

TABLE 1-3

LIVESTOCK CARRYING CAPACITIES AND USE: PRESENT, PROPOSED, AND FUTURE

Area	Acre	Actual Use ^{5/}	Present Active Preference (AUMs)	Proposed Licensed Use (AUMs)	Livestock Carrying Capacity After 20 Years (AUMs)	Estimated Livestock Use After 20 Years	Proposed Increase (+) or Decrease (-) in Livestock Use	Estimated Percent Increase (+) or Decrease (-) in Livestock Use After 20 Years (Compared to Present Use)
SUB-UNIT 1	89,020	3,579	5,000	0	10,226	0	100% -	100% -
SUB-UNIT 2								
Area A	17,400	1,304	1,445	957 ^{1/}	4,307	3,339	34% - (-78% - 3 years) variable	131% + (-23% - 3 years) variable
Area B	22,620	1,088	1,172	variable ^{2/}	2,375	0		
Area C	34,650	1,995	2,242	795	4,936	2,961	57% -	32% +
Area D	8,060	324	400	0	493	0	100% -	100% -
Area E	185,465	11,095	14,082	6,101	25,432	12,752	57% -	9% -
SUB-UNIT 3								
Area A	141,164	5,507	5,821	5,410 ^{3/}	19,736	10,055	7% -	73% +
Area B	159,000	6,861	7,947	10,432 ^{4/}	20,328	29,040	31% +	265% +
SUB-UNIT 4								
Area A	51,726	1,977	2,121	2,121	unknown	2,121	none	unknown
Area B	94,803	5,641	6,121	5,139	15,799	12,986	16% -	112% +
Area C	132,692	8,604	10,379	8,391	30,383	22,378	19%	
TOTAL		47,975	56,730	39,920	134,015 +	95,632	30% -	69% +

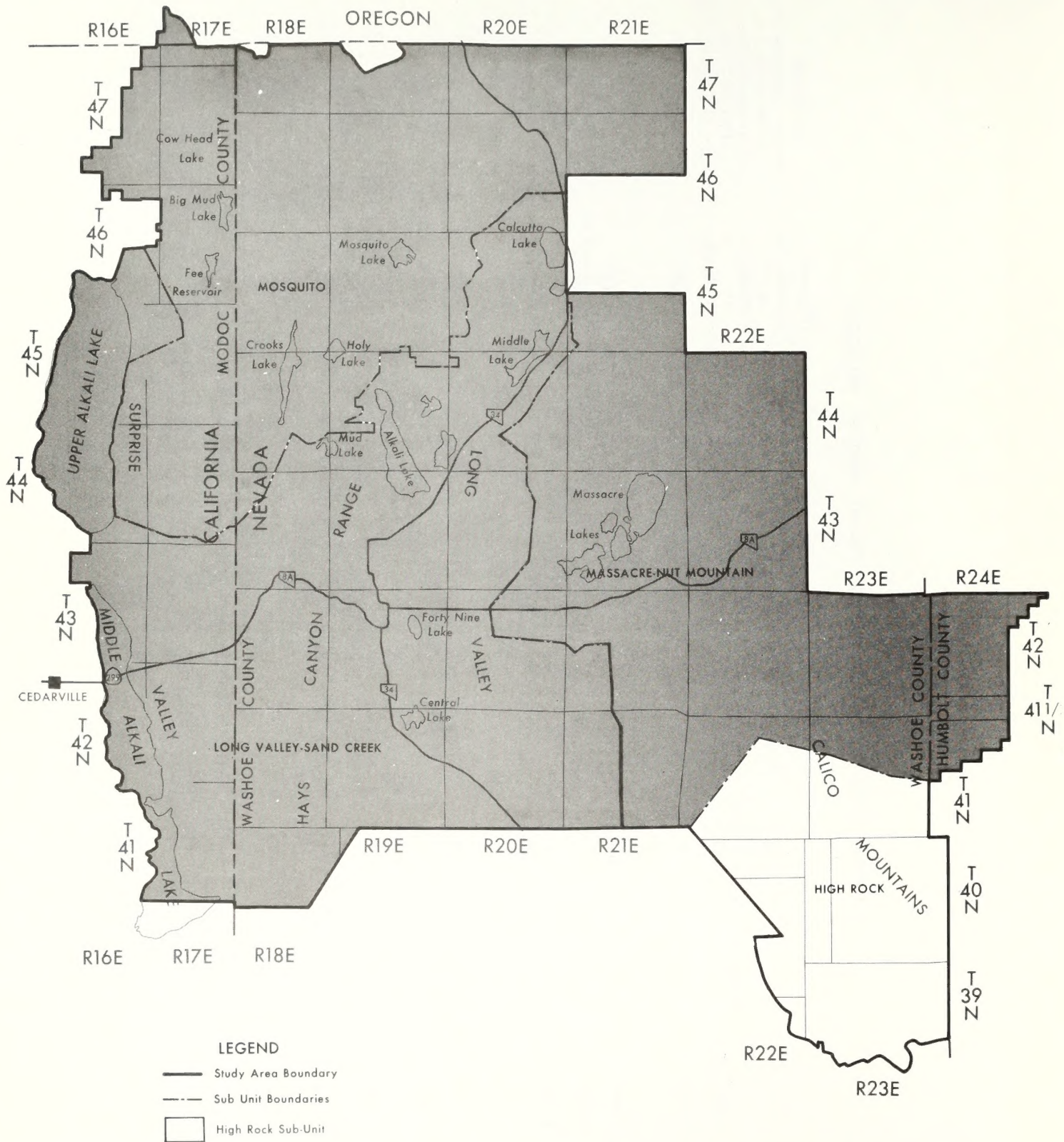
1/ Grazing Allowed one out of every three years.

2/ Prescribed grazing uses grazing periodically on a selective basis to meet habitat improvement goals.

3/ Includes 2,500 AUMs from Proposed Seeding.

4/ Includes 2,700 AUMs from Proposed Seeding. Proposed use does not exceed the carrying capacity as indicated. Capacity estimates are based on a stocking rate guides under season long use (Anderson, 1978) while proposed stocking rates are based on Fall use which allows additional forage to be harvested.

5/ 5 year average actual licensed use.



MAP 1-3

TABLE 1-4

Forage Consumption Summary (AUMs/yr.)
Sub-Unit 1, High Rock

	Existing Use	Present Carrying Capacity	Use Under Proposed Action
Livestock *	5,000	6,023	0
Wild Horses	3,456		0
Wildlife ^{1/}			
Deer	200		268
Antelope	704		1632
Bighorn Sheep	0		240
 TOTAL	 9,360	 6,023	 2,140

* Prior to full implementation, livestock will be grazed at moderate use levels (5,000).

^{1/} Represents actual quantity of livestock AUMs allocated for big game use. Due to dietary difference, the quality of forage for big game may be the limiting factor on populations. Actual use may therefore be less than the allocation.

Proposed Management

- (1) Cancel all grazing (5,000 AUMs) by 1983.
- (2) Remove all wild horses and burros.

Rationale for Management Proposal

High Rock contains a highly unusual and valuable concentration of resources. It encompasses: the route of a famous emigrant trail; the site of the last Indian massacre of whites; highly diverse and concentrated archaeological resources; historical inscriptions and buildings; an extraordinary density of eagle and falcon nesting sites; potentially good bighorn sheep habitat; riparian habitat capable of being increased in size and productivity, thus providing habitat for many native wildlife species now uncommon in the area; and 30 miles of scenic canyons which are, in part, proposed as a portion of the National Scenic Trails system. Up to 35 percent of the antelope in the Massacre Planning Unit concentrate in the High Rock area. In addition, the entire sub-unit contains wilderness characteristics and has either been designated or recommended WSA. Except for extensive vegetation changes resulting from livestock grazing and wildfire control, the area remains much as it has been for centuries.

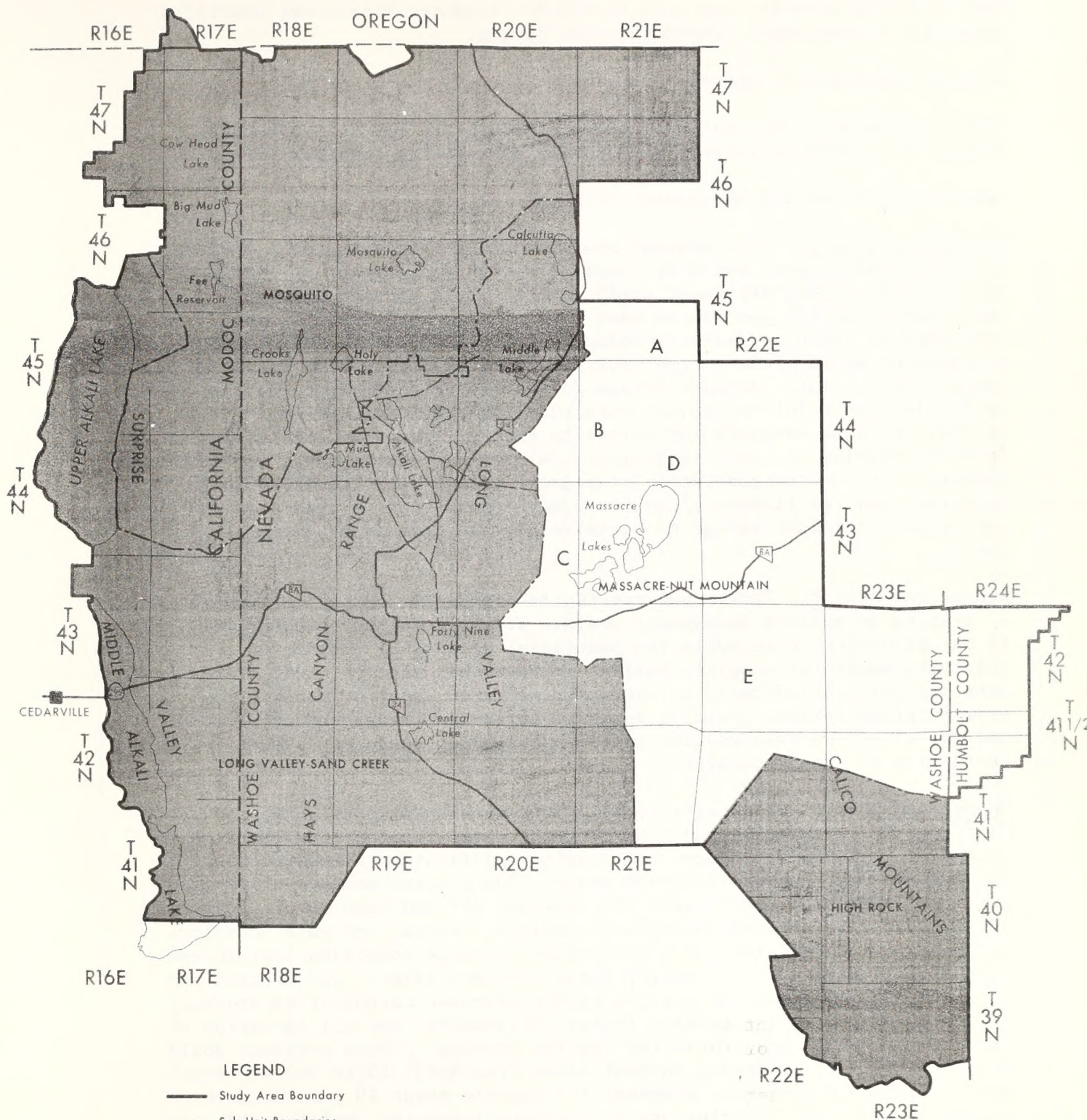
Preservation and enhancement of these primitive characteristics and development of climax vegetation conditions require elimination of factors causing modification of flora, fauna, and physical setting. Livestock and wild horse grazing have caused severe vegetation modifications under past management and would cause some degree of modification under any management. Livestock grazing has, therefore, substantially reduced this area's primitive character and precludes provision of wildlife habitat in climax condition. It would therefore be incompatible with proposed management of this sub-unit.

Sub-Unit 2, Massacre Mountain/Nut Mountain

Massacre Mountain/Nut Mountain (268,000 acres) is shown on MAP 1-4.

Land-Use Goals

- (1) Provide 260,000 acres of habitat in "good" condition for wildlife by 1998.
- (2) Protect significant archaeological sites and districts, and increase public awareness of their values and sensitivity.
- (3) Improve 232,000 acres of range from "poor/fair" to "good" condition by 1998 and provide a 10,000-AUM increase in livestock grazing.
- (4) Provide 90,000 acres of habitat in "good" condition for 205 wild horses.



The following priority was used to resolve resource management conflicts: wildlife, archaeology, livestock, wild horses.

Grazing Management Proposal

TABLE 1-5 details the grazing management proposals for this sub-unit. TABLE 1-6 summarizes large-mammal forage consumption for this sub-unit.

Rationale for Grazing Management Proposal

Management Area A: This grazing system was selected for Area A because: (a) regulated grazing would be compatible with achievement of land-use goals; (b) grazing deferment until June 15 would provide adequate opportunity for key species to meet physiological requirements and therefore to begin to improve ecological site condition; (c) light utilization would minimize the adverse effect of defoliation by livestock, would insure adequate forage for native wildlife species, and would minimize wildlife habitat structural change; (d) two full years of rest would be adequate for plants to recover from the effects of deferred grazing at light intensity; (e) seven miles of fence may be removed; (f) no reorganization of present grazing allotments would be required; and (g) livestock operators may combine use of this area and the Sheldon Antelope Refuge to minimize adverse impacts of non-use years.

Management Area B: Prescribed grazing is a periodic and selective use of grazing to achieve management goals. It was selected because: (a) it may be desirable to apply the beneficial effects of grazing on a selective basis for wildlife habitat improvement; (b) portions of the area are only periodically suitable for grazing; and (c) specific grazing prescriptions could be designed to avoid disturbance of archaeological areas, whereas routine grazing management could not insure protection of these resources.

Management Area C: The existing allotment management plan (AMP) for this area is functioning and constitutes a major capital investment. Allotment boundary adjustment and grazing modification recommendations are made to meet present land-use goals. The grazing management proposal for Area C was selected because the existing AMP had been developed and implemented with crested wheatgrass seedings, fences, and water developments and, with revision, it could result in range condition improvement with minimal expense. Currently, three problems exist: (1) excessively early turnouts which allow grazing before adequate carbohydrate storage has taken place; (2) excessive forage utilization; and (3) inclusion of rangeland which is unsuitable for routine grazing. These problems would be solved by: (1) changing turnout dates from April 15 to May 15, which would improve carbohydrate reserves and provide about 20 percent more forage volume; (2) limiting use to moderate intensity, which would prevent overgrazing and reduce the negative effects of defoliation; and (3) including the areas unsuitable for grazing in Area B.

TABLE 1-5

Sub-Unit 2 (Map 4)
Proposed Action: Massacre Mountain/Nut Mountain

Proposed Action Component	A (17,000 acres)	B (23,000 acres)	Management Area C (34,000 acres)	D (8,000 acres)	E (186,000 acres)
Grazing Proposal	Grazing 1 year out of every 3 years.	Prescribed grazing only.*	4 pasture rest/rotation.	Grazing would be eliminated.	4 pasture rest/rotation.
Season of Use	June 1 - Sept. 30	By Prescription	May 15 - Sept. 30	None	June 15 - Sept. 30
Key Species of Vegetation	Bluebunch wheatgrass, bitterbrush	By Prescription	Crested wheatgrass, Idaho fescue	None	Idaho fescue, bitterbrush
Forage Utilization Limit (key species)	Light (20-40%)	By prescription	Moderate (41-60%)	N/A	Light
Grazing Formula to be Applied	J F M A M J J A S O N D /////	Developed for each prescribed use of grazing.	J F M A M J J A S O N D /////	None	J F M A M J J A S O N D /////
////// ///// = Graze	REST REST	REST REST	REST REST	REST REST	REST REST
Number of Water Facilities to be Developed	6 springs	None	3 springs 4 stock ponds 2 wells	None	10 springs 10 stock ponds 5 wells
Miles of fence to be added (+) or removed (-)	-7 (pasture fence) +3 (sensitive habitats)	-4 (pasture fence)	+2 (gap fencing)	+8 (exclusion fence)	+5 (sensitive habitat)
Livestock Use Changes**	78% reduction overall 34% reduction in use year.	Variable	57% reduction	100% reduction (1983)	57% reduction
Stocking Rate Prior to Full Implementation (1981-82)	621	- 1,172	2,242	- 400	7,041
Special Features	Up to 50% of all aspens and meadows would be fenced. Maintain 37 wild horses.	Grazing would be used on a prescribed basis for specific vegetation modification needs. Maintain 33 wild horses.	Maintain 29 wild horses	Remove all wild horses.	Up to 50% of all meadows would be fenced. Maintain 106 wild horses. Operators from 3 allotments will be combined.
Implementation Schedule	Develop water 1981, 1982 Fence aspen/meadows 1981, 1982 Start grazing system 1983	Remove/install fence 1981-82 Start rest treatment 1982 Apply prescribed grazing 1987	Continue 1978 AMP Develop water/gap fence 1981 Implement system modification 1982	None	Develop water 1981, 1982 Fence meadow 1981, 1982 Fence pastures 1982 Start grazing system 1983

* Grazing would be "prescribed" to achieve specific management goals, i.e., no grazing for 5 years then heavy grazing for 10 days to keep deer browse in optimum form class.

** Livestock reductions required to achieve established utilization levels will be made prior to the 1981 grazing season. Further reductions required to implement grazing systems will be made in 1983. Prior to full implementation, livestock will be grazed at moderate use levels in Sub-Units 2B and 2D.

TABLE 1-6
Forage Consumption Summary (AUMs)
Sub-Unit 2 Maasacre Mountain/Nut Mountain

	Management Area A			Management Area B			Management Area C			Management Area D			Management Area E			Totals		
	Existing Use	Present Carrying Capacity	Use Under Proposed Action	Existing Use	Present Carrying Capacity	Use Under Proposed Action	Existing Use	Present Carrying Capacity	Use Under Proposed Action	Existing Use	Present Carrying Capacity	Use Under Proposed Action	Existing Use	Present Carrying Capacity	Use Under Proposed Action	Existing Use	Present Carrying Capacity	Use Under Proposed Action
LIVESTOCK																		
Use Year (3 yr. cycle)	1,445 (4,335)	1,246	957 (957)	1,172	1,129	None until range reaches good condition then variable.	2,242	1,625	795	400	435	0	14,082	15,433	6,101	19,341	19,888	7,853
WILD HORSES	666		444	594		816	1,044		522	360		0	2,502		1,908	5,166		3,690
WILDLIFE ^{1/}																		
Deer	225		309	135		185	0		0	0		0	826		1,132	1,186		1,626
Antelope	75		145	68		131	0		0	0		0	263		508	406		784
TOTAL (Use Year) (3 Yr. Cycle)	2,411 (5,301)	1,246	1,855 (1,855)	1,969	1,129	1,132	3,286	1,625	1,317	760	435	0	17,673	15,433	9,649	26,099	19,888	13,953

^{1/} Represents actual quantity of livestock AUMs allocated for big game use. Due to dietary differences, the quality of forage for big game may be the limiting factor on populations. Actual use may therefore be less than the allocation.

Management Area D: Livestock exclusion from Area D was selected because livestock are trampling archaeological sites. These resources are of exceptional character, occur in unusual densities, and qualify for inclusion in the National Register of Historic Places.

Management Area E: This grazing system was designed to: (a) eliminate spring competition between wildlife and livestock by deferring grazing until June 15; (b) improve the condition and reproduction of grasses and browse through grazing deferment, by providing two years of rest after grazing, and by limiting grazing by livestock to light intensity; (c) insure browse availability for deer and antelope by using bitterbrush for a key species and by limiting livestock use of key species to 20-40 percent of annual production; (d) manage the intensity and duration of grazing to promote change in vegetation composition to achieve an average of 50-75 percent of climax vegetation (midsuccessional wildlife habitat) through grazing restraints; (e) require minimum fencing through combination of existing allotments and through the use of herding; and (f) achieve the above at minimal cost.

Sub-Unit 3, Long Valley/Sand Creek

Long Valley/Sand Creek (300,000 acres) is delineated on MAP 1-5.

Land-Use Goals

- (1) Improve range condition to reach "good" condition on 280,000 acres and produce 15,000 AUMs of additional livestock forage by 1998.
- (2) Improve wildlife habitat to "good" ecological condition on 260,000 acres and to "excellent" condition on 1,000 acres by 1998.
- (3) Protect significant archaeological sites and enhance public awareness of their values.
- (4) Provide 40,000 acres of habitat in good condition for 36 wild horses.

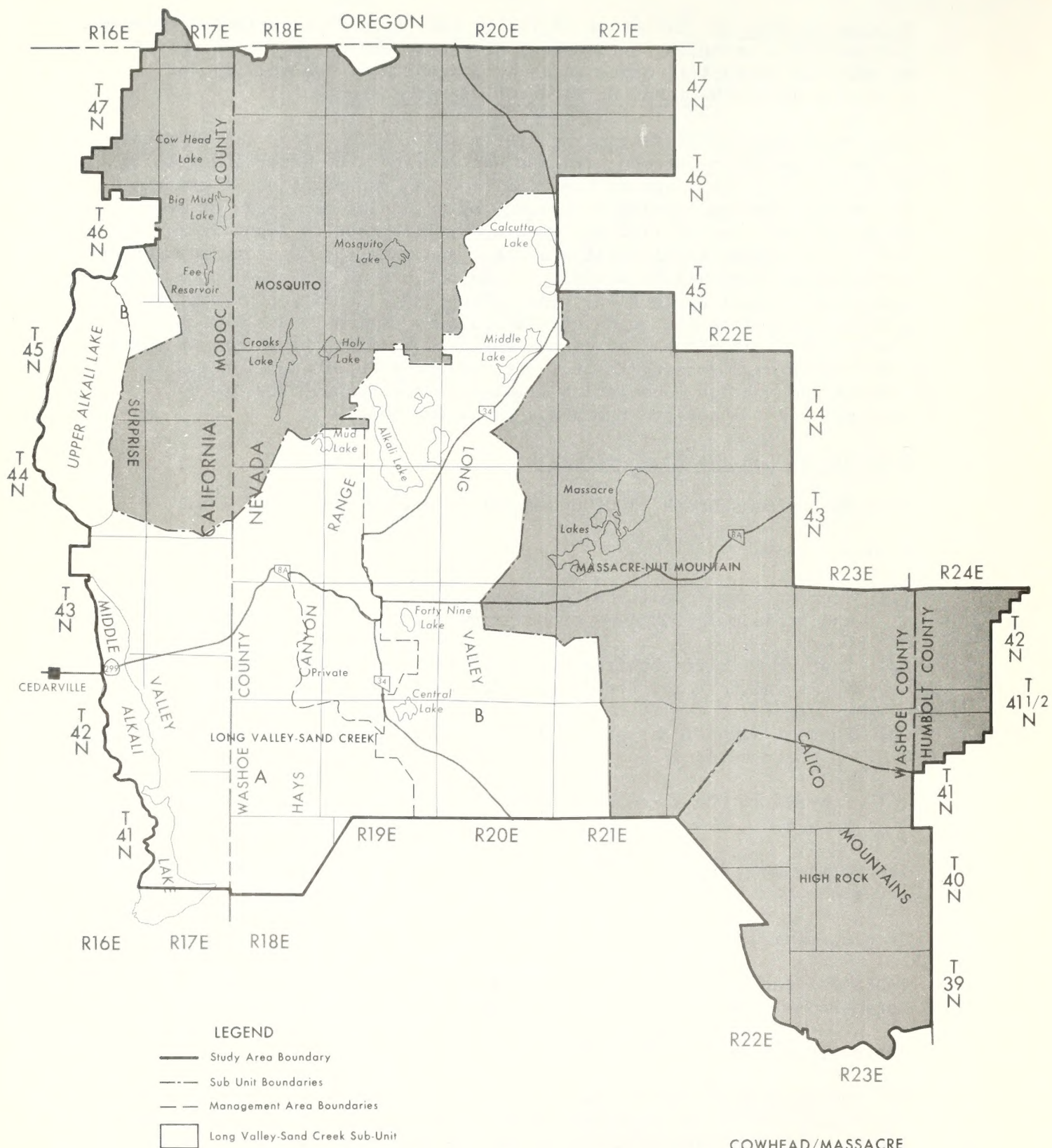
The following priority was used to resolve resource management conflicts: livestock, wildlife, archaeology.

Grazing Management Proposal

TABLE 1-7 details the grazing management proposals for Sub-Unit 3. Large-mammal forage consumption is summarized on TABLE 1-8.

Rationale for Grazing Management Proposal

Management Area A: This grazing system was designed to: (a) initiate range improvement by deferring livestock use of the range until a later development stage (boot stage) of key species which increases plant production, by limiting vegetation utilization to 40-60 percent of annual production, and by providing two years of rest after moderate grazing use to recover from the effects of defoliation; (b) stabilize



MAP 1-5

TABLE 1-7

Sub-Unit 3, (Map 5)
Proposed Action: Long Valley/Sand Creek

Proposed Action Component	Management Area A (141,000 acres)	Management of Seeded Areas in Area A	Management Area B (159,000 acres)	Management of Seeded Areas in Area B
Grazing Proposal	4 pasture rest/rotation.		Fall/winter use.	
Season of Use	May 15 - Sept. 30	April 15 - Oct. 30	Aug. 15 - Nov. 30	May 1 - Aug. 15
Forage Utilization Limit	Moderate (41-60%)	Moderate (41-60%)	Moderate (41-60%)	Moderate (41-60%)
Key Species of Vegetation (Key Species)	Idaho fescue, bitterbrush	Crested wheatgrass	Great Basin wildrye	Crested wheatgrass
Grazing Formula to be Applied	J F M A M J J A S O N D /////	None	None	None
//// = Graze	REST /////			
	REST /////			
	REST			
Number of Water Facilities to be Developed	10 springs 10 stock ponds 5 wells	Included under Area A	10 springs 10 stock ponds 10 wells	Included under Area B
Miles of Fence Added (+) or Removed (-)	+25 (pasture) +10 (meadow and stream)	Included under Area A	+3 (meadows)	Included under Area B
Range Treatments (acres)	10,000 plow/seed	N/A	11,000 plow/seed	N/A
**Livestock Use Changes	7% reduction*		31% increase*	
Stocking Rate Prior to Full Implementation (1981-82)	3,881		5,298	
Special Features	Sand Creek and 50% of meadows fenced. Maintain 26 wild horses.	Seedings would partially off-set season of use restrictions in Area A.	50% of meadows fenced.	Seedings would partially off-set changes in season of use.
Implementation Schedule	Develop waters 1981, 82 Fence meadow/stream 1981,82 Fence pastures 1982 Start grazing system 1983	Develop seedings 1981, 82 Start grazing 1984	Develop waters 1981, 82 Fence meadows 1981, 82 Initiate fall/winter grazing 1982	Develop seedings 1981, 82 Start grazing 1984

* Production from range seedings are included.

** Livestock reductions required to achieve moderate utilization will be made prior to the 1981 grazing season. Further reductions required to implement grazing systems will be made in 1983.

TABLE 1-8
Forage Consumption Summary (AUMs yr.)

Sub-Unit 3, Long Valley/Sand Creek

	Management Area A			Management Area B			Totals		
	Existing Use	Present Carrying Capacity	Use Under Proposed Use	Existing Use	Present Carrying Capacity	Use Under Proposed Use	Existing Use	Present Carrying Capacity	Use Under Proposed Use
LIVESTOCK	5,821	4,851	2,445*	7,947	6,524	7,732*	13,768	11,375	10,642*
WILD HORSES	468		468	0		0	468		468
WILDLIFE ^{1/}									
Deer	300		412	0		0	300		412
Antelope	173		334	30		58	203		392
SEEDING			2,500			2,700			5,200
TOTAL	6,762	4,851	6,624 (4,124*)	7,977	6,524	10,490	14,739**	11,375	17,114

* Before seedings.

** For explanation see Chapter 3, Vegetative Production, Sub-Unit 3.

^{1/} Represents actual quantity of livestock AUMs allocated for big game use. Due to dietary differences, the quality of forage for big game may be the limiting factor on populations. Actual use may therefore be less than the allocation.

livestock operations by allowing moderate use rather than more restrictive utilization limits; and (c) improve wildlife habitat by eliminating livestock-wildlife competition during early spring (until May 15), by moderating habitat structural change caused by grazing, by keying utilization to the preferred browse species, by providing 50 percent of the area in an ungrazed condition each year, and by fencing 50 percent of the most sensitive habitat areas, as well as Sand Creek.

Range treatments are proposed because: (a) the area to be treated would not be expected to respond to grazing management in a reasonable time because of insufficient natural seed sources and shrub dominance; (b) the areas to be treated are capable of responding to treatment; (c) limited resource conflicts exist; and (d) an increase in range production would reduce negative economic impacts resulting from implementation of the proposed grazing management system on the native range.

Management Area B: Fall and winter grazing was selected to: (a) improve range condition by maximizing range recovery by limiting grazing to the period after seedripeness and during dormancy of the key species; (b) stabilize the livestock industry by allowing a higher level of livestock use while maximizing resource recovery; (c) improve nongame wildlife habitat by allowing maximum recovery of a severely modified habitat type, by deferring use until mid-summer, by fencing 50 percent of all meadows, by not using any pasture fencing, and by limiting use to moderate intensity.

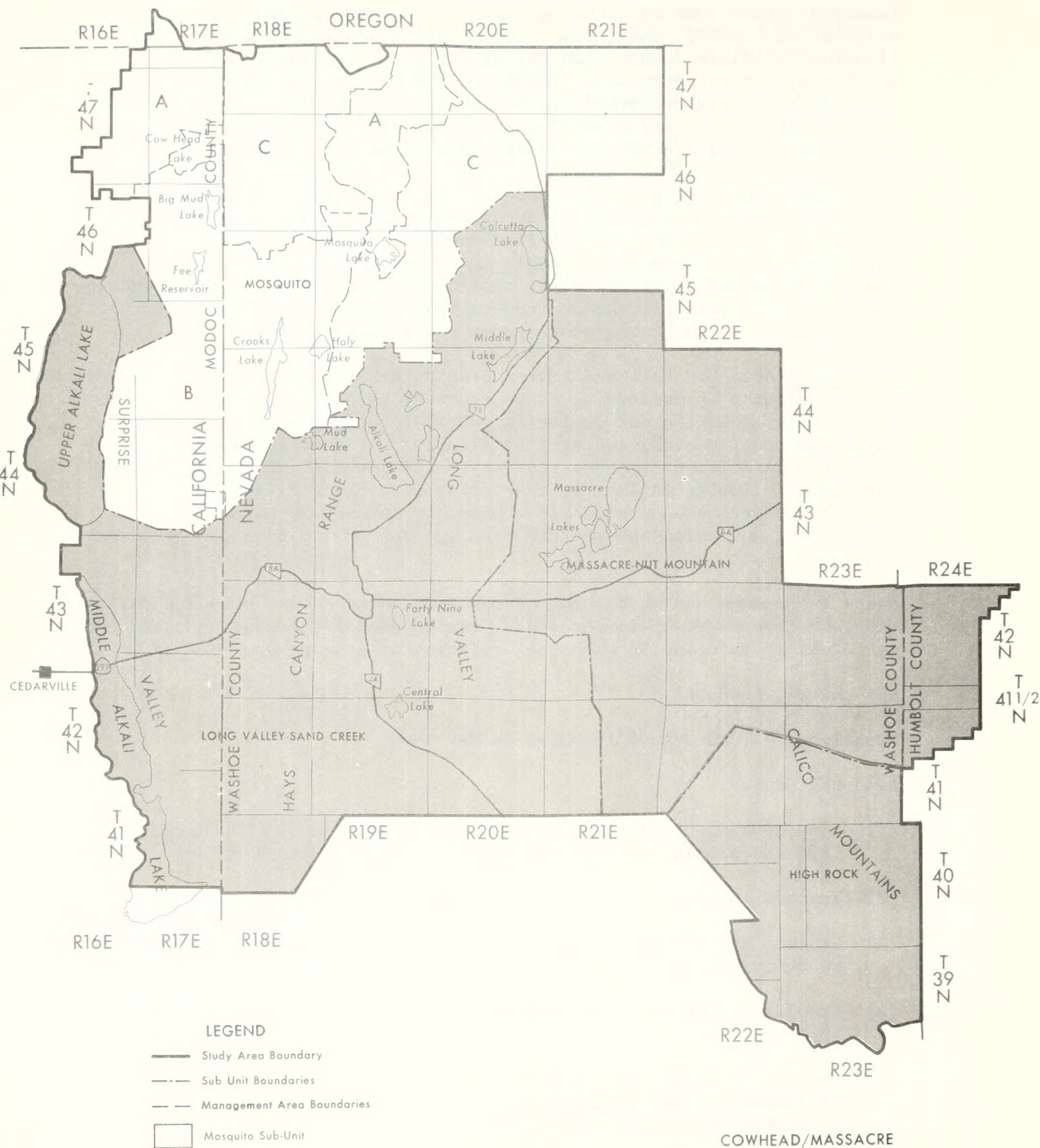
Range treatments and management of the treated areas are proposed for the same reasons shown for Area A. Grazing use of the seeding would end on August 15 to coincide with the beginning of grazing use on Area B.

Sub-Unit 4, Mosquito

Mosquito (277,000 acres) is shown on MAP 1-6.

Land-Use Goals

- (1) Improve range conditions to "good" condition on 275,000 acres by 1998 and provide 15,000 additional AUMs of livestock forage.
- (2) Improve 10 miles of fisheries to "excellent" condition by 1998.
- (3) Protect significant archaeological sites and enhance public awareness of their values.
- (4) Provide 40,000 acres of habitat in "good" condition for 31 wild horses.
- (5) Manage the Twelve Mile Creek area for the protection and enhancement of listed species Cordylanthus capitatus and Galium glabrescens ssp. modocense which both occur there.



COWHEAD/MASSACRE
STUDY AREA
GRAZING ENVIRONMENTAL STUDY
MOSQUITO SUB-UNIT

The following priority was used to resolve resource management conflicts: livestock, wildlife, archaeological resources, wild horses, recreation.

Grazing Management Proposal

TABLE 1-9 gives the details of the grazing management proposals for Sub-Unit 4. TABLE 1-10 summarizes large-mammal forage consumption for the sub-unit.

Rationale for Grazing Management Proposal

Management Area A: Less intensive management was selected because much of the land in Area A is privately owned. The primary responsibility for achievement of resource objectives would be with the livestock operator. Season of use and degree of forage utilization are specified but specific grazing management techniques would be developed by the livestock operator. Later livestock turnout dates and utilization limitations would place grazing within guidelines required for general range improvement. Less intensive management would provide the livestock operator greatest flexibility within the constraints established. A portion of sensitive habitats would be fenced to insure their protection. This management proposal would place discontinuous blocks of public land under management with little expense.

Management Area B: This grazing system was designed to: (a) improve the condition of grasses and forbs by limiting utilization and providing deferment and rest; (b) allow grazing to begin at the phenological stage of vegetation which is most advantageous for livestock production; (c) conform to the topographic features of the area; (d) moderate the need for fencing; and (e) reduce disruption of current livestock operations.

Management Area C: This grazing system was designed to: (a) improve the reproduction and vigor of grasses and palatable shrubs by deferment of grazing, by providing two years of rest after grazing, and by limiting grazing to moderate utilization of annual production; (b) allow grazing to begin when forage condition is good for livestock weight gains; (c) reduce spring competition between wildlife and livestock by delaying livestock grazing until May 15; and (d) insure browse availability for deer and antelope by using bitterbrush as a key species and limiting utilization of bitterbrush to moderate intensity.

Evaluation of Effectiveness of Proposed Management

A comprehensive monitoring system will be implemented on the planning unit. Components to be monitored will include:

- (a) Utilization of key species by wildlife and livestock;
- (b) Vegetative condition and trend;
- (c) Condition and trend of key wildlife habitats;

TABLE 1-9
Sub-Unit 4, (Map 6)
Proposed Action: Mosquito

Proposed Action Component	A (50,000 acres)	Management Area B (95,000 acres)	C (132,000 acres)
Grazing Proposal	Less intensive management	3 pasture rest/rotation	4 pasture rest/rotation.
Season of Use	May 15 - Sept. 30	May 15 - Sept. 30	May 15 - Sept. 30
Forage Utilization Limit	Moderate (41-60%)	Moderate (41-60%)	Moderate (41-60%)
Key Species of Vegetation	Bluebunch wheatgrass, Idaho fescue, bitterbrush	Bluebunch wheatgrass, Idaho fescue	Bluebunch wheatgrass, bitterbrush
Grazing Formula to be Applied	To be developed by the livestock operator	J F M A M J J A S O N D //// //// //// REST	J F M A M J J A S O N D //// //// //// REST //// //// REST
Number of Water Facilities to be Developed	6 springs	10 springs 10 reservoirs 10 wells	10 springs 10 reservoirs 15 wells
Miles of Fence Added (+) or Removed (-)	+3 (meadows, aspen and white fir)	+15 (pasture) + 7 (meadow/aspen)	+20 (pasture) +10 (meadow/aspen stream)
Livestock Use Changes*	No change	16% reduction	19% reduction
Stocking Rate Prior to Full Implementation (1981-82)	2,121	5,975	9,633
Special Features	Issue 10-year permits, Vegetative sites such as aspen, meadow, white fir and mountain brush will be fenced should these areas not respond under custodial management. Remove all wild horses	25% of aspens and 50% of meadows would be fenced, Maintain 32 wild horses.	Fence 25% of aspen and 50% of meadows; Coleman Creek and 12 Mile Creek would be fenced.
Implementation Schedule	Develop waters 1981 Fence sensitive areas 1981 Issue 10-year permits 1982	Develop waters 1981, 82 Fence sensitive habitat 1981, 82 Fence pastures 1982 Start grazing system 1983	Develop waters 1981, 82 Fence sensitive habitat 1981, 82 Fence pastures 1982 Start grazing system 1983

* Livestock reductions required to achieve moderate utilization will be made prior to the 1981 grazing season. Further reductions required to implement grazing systems will be made in 1983.

TABLE 1-10
Forage Consumption Summary (AUMs yr.)

	Sub-Unit 4, Mosquito						Totals					
	Management Area A			Management Area B			Management Area C					
	Existing Use	Present Carrying Capacity	Use Under Proposed Action	Existing Use	Present Carrying Capacity	Use Under Proposed Action	Existing Use	Present Carrying Capacity	Use Under Proposed Action	Existing Use	Present Carrying Capacity	Use Under Proposed Action
LIVESTOCK	2,121	3,750	2,121	6,121	6,374	5,139	10,379	13,396	8,391	18,621	23,520	15,651
WILD HORSES	162		0	1,134		576	0		0	1,296		576
WILDLIFE ^{1/}												
Deer	1,126		1,453	120		165	781		1,071	2,027		2,779
Antelope	0		0	67		130	361		696	428		826
TOTAL	3,409	3,750	3,664	7,442	6,374	6,010	11,521	13,396	10,158	22,372	23,520	19,832

^{1/} Represents actual quantity of livestock AUMs allocated for big game use. Due to dietary differences, the quality of forage for big game may be the limiting factor on populations. Actual use may therefore be less than the allocation.

- (d) Precipitation;
- (e) Water quality and quantity;
- (f) Threatened and endangered plant species (The populations of Galium Glabrescens ssp. modocense and Cordylanthus capitatus in the Twelve Mile Creek area will be monitored annually. Phenological, population, and utilization data will be collected on these species at the end of each grazing season. Adjustments in utilization and seasons will be made as deemed necessary to protect these plants species. Monitoring systems will be discontinued if the status of both plants as covered under BLM's management guidelines becomes such that they are no longer on any of those lists included in BLM's management guidelines for rare, threatened, endangered, or sensitive species.);
- (g) Game and nongame wildlife populations;
- (h) Wild horse and burro populations;
- (i) Fishery populations and habitat; and
- (j) Cultural resources.

The methods to be used will allow evaluation of the effectiveness of management plans. The monitoring system will also provide the basis for any adjustments in the management plans. A comprehensive monitoring system has been adopted for the Tuledad/Home Camp Unit, which is contiguous to the Cowhead/Massacre Unit, and is expected to provide most of the methodology for this unit.

Additional staffing to carry out the monitoring and subsequent refinements will include two range conservationists, one biologist and one archaeologist.

Facilities and Treatments to Implement the Proposal

Maintenance of range facilities would be the responsibility of either the licensee or BLM. Maintenance responsibility would be provided in the range improvement project plans.

Land Treatments

The exact location of areas suitable for sagebrush control and artificial seedings will be identified in the AMPs. Sagebrush control would be achieved by plowing with a brushland plow. The brushland plow is a heavy-duty multiple disk plow which is pulled through the soil. The plowing would destroy 90-95 percent of the shrub cover and most of the herbaceous cover as well. Following sagebrush control, the plowed areas would be artificially seeded with a rangeland drill. The seeding mixture would depend largely on the site and will be specified in the AMP.

Water Developments

Springs: A spring discharging from one point would be developed using a backhoe to excavate a hole 4 feet square and 3 feet deep. A perforated pipe would be inserted vertically as a collection box. Where water seeps from a larger area, perforated pipes would be buried horizontally throughout the seep to direct water to the collection box. Free-flowing water would be provided at ground level near the collection box for wildlife and to insure that the meadow would not dry up. Excess water would be piped to a trough. Overflow water would be piped back to the original drainage course. The spring and meadow complex would be fenced.

Reservoirs: Dike and pit type reservoirs would be constructed. The dike type would be placed on drainages with 1-3 percent slopes. Construction would consist of moving fill material immediately above the dike or from a nearby source to create a dam structure. An adequate spillway would be provided for overflow. To allow waterfowl use, design specifications would include irregularly shaped shorelines, peninsulas, and islands if the size of the structure warrants such action.

Pit-type reservoirs would be constructed on drainages with less than 1-percent slope or on dry lakebeds. Construction would consist of digging a pit to a predetermined size depending on the availability of and need for water.

Some proposed reservoirs would be fenced and those having fishery potential would maintain a minimum pool, and would be managed to sustain a fisheries.

Water Troughs: All troughs would include a ramp so small birds and mammals can escape from the trough. Troughs in areas devoid of a close, permanent source of water would include a solid bird ladder so a large bird such as an eagle, sage hen, etc., can water.

Wells and Windmills: Well and windmill construction would consist of drilling a 6-inch-diameter hole to an aquifer. A concrete pad would be poured on the surface to support a windmill and a livestock watering trough.

Wells providing water for wildlife would remain operable every year, including the "rest" years.

Fences

All fences would be constructed to BLM Manual Chapter 1737 Type I specifications for antelope and deer. All pasture fences would be three-strand. The bottom strand would be smooth wire raised 18 inches from the ground. The gap between the top and second strands would be 12 inches. Total height would not exceed 38 inches. Protective fences around pasture springs, reservoirs, and critical wildlife habitat excluded from grazing would be four-strand not exceeding 42 inches in height.

Guidelines for Implementation

An environmental assessment would be prepared on each allotment management or habitat management plan before any improvements could be undertaken.

The following guidelines would apply to all improvement work:

- (1) Permanent roads or trails would not be constructed to project sites. Existing access and off-road vehicles would be used where needed (BLM policy);
- (2) A cultural resource survey would be required for each project site before construction (BLM policy; National Historic and Preservation Act of 1966; National Environmental Policy Act of 1969; Executive Order 11593; 36 CFR 800);
- (3) Endangered and threatened species survey and clearance would be required for each project site before construction (Endangered Species Act). Also, the BLM policy on Conserving Rare, Threatened or Endangered Plants on Public Lands in California (I.M. No. CA-77-256) requires that special consideration be given to candidate species and California Native Plant Society listed species. Any species found that are on lists covered by the above Instruction Memo will be given that consideration required by I.M. No. CA-77-256;
- (4) Disturbance of soil and vegetation at all project sites would be held to an absolute minimum (BLM policy; BLM Manual 6300);
- (5) Land clearing of only the project site would be allowed except on sites requiring excavation (BLM policy; BLM Manual 6300);
- (6) Areas where soils would be disturbed would be finished to blend into the surrounding soil surface (BLM policy; BLM Manual 6300);
- (7) Visual resource contrast ratings would be applied in the planning stage of all proposed facilities (BLM policy; BLM Manual 6300);
- (8) Project implementation in wilderness study areas will follow the non-impairment criteria of the Wilderness Act, the BLM Interim Management Policy for lands under wilderness review and Section 603C Federal Land Policy and Management Act. This may include but is not limited to:
 - (a) Areas disturbed by developments could be revegetated with native plant species;
 - (b) Fences, water troughs, etc., could be painted to blend with the surrounding landscape;
 - (c) Fences and other developments may not be placed on visible skylines;
 - (d) No blading of roads or fencelines would be allowed within areas under wilderness review.

Guidelines for Livestock Operators

Livestock salting would not be allowed within one-fourth mile of springs, aspen stands, meadows or streams.

TABLE 1-11

RELATIONSHIP OF GRAZING PROPOSAL TO LAND USE PLANNING

High Rock

Livestock Land Use Recommendations	Other Land Use Recommendations	Conflicts	Conflict Resolution	Resource Trade-Offs
Develop systematic livestock grazing plans.	<u>Wildlife</u>	The presence of live-stock reduces the chance of successful bighorn sheep reintroduction & grazing degrades riparian areas & other wildlife habitat.	Cancel grazing to maximize the protection and improvement of other resources.	5,000 AUMs of grazing are lost.
a. Provide 2 years rest.	Eliminate grazing.			
b. Turn out livestock at boot stage of key species.	<u>Recreation</u>			
	Eliminate grazing.			
c. Limit grazing to moderate utilization.	<u>Wild Horses</u>	Grazing reduces the primitive character of the area by altering flora & fauna.		
d. Start systems with existing livestock numbers.	Eliminate grazing.			
	<u>Cultural Resources</u>	Livestock competes for forage, water & space with horses.		
	Eliminate grazing in the canyons	Grazing has & would continue to alter the natural landscape from historic conditions. Livestock are physically destroying archaeological sites.		

TABLE 1-11 (Continued)

RELATIONSHIP OF GRAZING PROPOSAL TO LAND USE PLANNING

Massacre Mountain/Nut Mountain

Livestock Land Use Recommendations	Other Land Use Recommendations	Conflicts	Conflict Resolution	Resource Trade-Offs
Manage all allotments under systematic grazing.	<u>Wildlife</u>			
a) Provide 2 yrs. of rest after grazing.	1) In low sage & bitterbrush habitat types use a 4 pasture rest-rotation grazing, June 15 - Sept. 30, rest 2 pastures and limit utilization to light - moderate use.	1) Improvement of wildlife habitat requires later turnout dates and lighter grazing use.	1) Management Area "g" helps support deer & antelope which migrate from the Sheldon Refuge. The animals are dependent on forbs in spring & bitterbrush in summer & fall. The grazing proposal of 2 yrs. rest following grazing was accepted but later grazing seasons to provide forbs & light grazing keyed to bitterbrush is recommended.	1) Implementation of a 4 pasture rest-rotation grazing system at light use requires a 59% grazing reduction. (8,027 AUMs).
b) Turn out about May 15th (boot stage of key species).				
c) Limit utilization to moderate use in key areas.				
d) Start grazing systems with existing numbers of livestock & adjust numbers or season of use as required at the end of the first grazing cycle.	2) In low sagebrush & big sagebrush habitats (without bitterbrush) use 2 pasture grazing system resting half the range each year & graze from July 1 - Sept. 30 at light - moderate intensity.	2) Same as above.	2) This grazing system was not recommended.	2) None
	3) In aspen, willow, bitterbrush or all habitat types graze the allotment once every 3 yrs. from June 1 - Sept. 30 with utilization up to moderate use.	3) Same as above.	3) Management Area "A" contains aspen, willows, & bitterbrush. It is topographically distinct, it is adjacent to the Sheldon Refuge & it's boundary fenced. The wildlife recommendation was accepted.	3) Implementation of this system requires an 78% reduction in grazing over 3 yrs. (3,540 AUMs).

TABLE 1-11 (Continued)

RELATIONSHIP OF GRAZING PROPOSAL TO LAND USE PLANNING

Massacre Mountain/Nut Mountain

Livestock Land Use Recommendations	Other Land Use Recommendations	Conflicts	Conflict Resolution	Resource Trade-Offs
<u>Wildlife (Con't.)</u>				
4) Existing allotment fences should be used. New fences should not be allowed.	4) New fences create new allotments & combines operators, causes wildlife deaths & is scenically displeasing.	4) Existing allotment fences were not always acceptable. Some were removed & more added. Fencing was minimized.	4) Existing allotment fences were not always acceptable. Some were removed & more added. Fencing was minimized.	4) 11 miles of fence will be removed & 18 miles of fence added.
5) Bitterbrush should be used as a key species wherever it occurs & no more than moderate use should be allowed.	5) Livestock management keys on grasses not bitterbrush.	5) Management was keyed to bitterbrush utilization where it occurred significantly.	5) Management was keyed to bitterbrush utilization where it occurred significantly.	5) Management will not be so closely keyed to livestock criteria.
6) A habitat management plan should be the dominant activity plan.	6) Allotment management plans are normally the dominant activity plan controlling grazing.	6) HMPs will be dominant on management areas A, B, E.	6) HMPs will be dominant on management areas A, B, E.	6) Wildlife habitat condition will be the controlling factor in grazing use instead of livestock forage management dictating appropriate grazing use.
<u>Archaeology</u>				
1) Manage the northwestern margin of the Massacre Lake Basin under an interim program of deferred development & limited use (no increase in livestock or water developments).	1) Grazing systems increase the density of grazing & usually require water & fence developments.	1) Management Area "B" is marginally suitable to grazing & the systematic grazing recommended conflicts with protection of archaeological resources. To allow grazing, to protect archaeological sites & to improve habitat condition, prescribed grazing is recommended. Grazing can be tailored to all resource needs on a site specific basis.	1) Management Area "B" is marginally suitable to grazing & the systematic grazing recommended conflicts with protection of archaeological resources. To allow grazing, to protect archaeological sites & to improve habitat condition, prescribed grazing is recommended. Grazing can be tailored to all resource needs on a site specific basis.	1) Periodic grazing is not adaptable to livestock operations. Grazing use (1,172 AUMs) will not be routinely available.

TABLE 1-11 (Continued)
RELATIONSHIP OF GRAZING PROPOSAL TO LAND USE PLANNING

Massacre Mountain/Nut Mountain

Livestock Land Use Recommendations	Other Land Use Recommendations	Conflicts	Conflict Resolution	Resource Trade-Offs
	<u>Watershed</u>			
	1) Grazing intensity & duration should be limited to provide adequate residue for soil surface protection.	1) Grazing systems may not provide adequate soil surface protection.	1) Light to moderate grazing is recommended to provide soil surface protection.	1) See wildlife recommendation (1) & (3) and archaeology (1) & (2).
	2) Grazing should be regulated to permit survival of existing grasses & forbs.	2) Grazing system may not permit survival of forbs.	2) Grazing seasons are adjusted to favor forb & grass survival & utilization of grasses is controlled in grazing recommendations.	2) See wildlife recommendation (1) & (3) and archaeology (1).
	3) Sagebrush should be reduced to 20-30% cover.	3) There are no proposals for direct sagebrush reductions.	3) Sagebrush is currently about 20-30% cover.	3) None.
	4) Highly restricted use of lakebeds, sand dunes and alkali lakes should occur. If not protected from grazing dust clouds & sand dunes will develop.		4) Management Area "D" protects a large portion of such fragile areas. Management Area "C" allows periodic grazing on fragile areas.	4) See archaeology (2) & (3) and below.
			5) Management Area "C" is in an existing allotment management plan. The livestock recommendation was accepted with the exception of provision (D). Livestock use would be adjusted to estimated carrying capacity before implementing the grazing system.	5) A reduction in 1278 AUMs of grazing will result.

TABLE 1-11 (Continued)

RELATIONSHIP OF GRAZING PROPOSAL TO LAND USE PLANNING

Massacre Mountain/Nut Mountain

Livestock Land Use Recommendations	Other Land Use Recommendations	Conflicts	Conflict Resolution	Resource Trade-Offs
<u>Archaeology (Con't.)</u>				
	2) Intensively manage the northern Massacre Lake shore & dunes for maximum enhancement of cultural values stressing resource protection & avoidance of conflicting uses (no grazing).	2) Grazing systems would include this area & continue to impact archaeological sites.	2) Management Area "D" was created to encompass portions of (2) & (3). Elimination of grazing is recommended to protect the archaeological sites.	2) Grazing use of 400 AUMs will be lost.
	3) Manage the northern margin of Massacre Lake as an archaeological reserve zone, with restrictions on access & limitations on conflicting uses (no grazing).	3) Same as above.	3) Same as above.	3) Same as above.
<u>Wild Horses</u>				
1) Remove all livestock.		1) Livestock compete with horses for forage, water & space.	1) Removal of livestock to improve conditions for horses was rejected.	1) Wild horses will continue to compete with livestock & wildlife but to a lesser extent.
2) Remove Board Corral/Sagehen/Massacre Lakes pasture fence.		2) The allotment fences cause winter horse die-offs.	2) Pasture fences are to be removed as recommended.	2) Cattle will be less controlled & will require more range supervision.

TABLE 1-11 (Continued)

RELATIONSHIP OF GRAZING PROPOSAL TO LAND USE PLANNING

Long Valley/Sand Creek

Livestock Land Use Recommendations	Other Land Use Recommendations	Conflicts	Conflict Resolution	Resource Trade-Offs
Implement systematic grazing management.	<u>Wildlife</u>			
a) Provide a minimum of 2 years of rest.	1) No livestock grazing should be allowed in southwestern Long Valley/Sand Creek.	1) Grazing conflicts with antelope habitat condition.	1) Livestock grazing will continue.	1) Antelope habitat will continue to be affected by live-stock.
b) Start grazing at boot stage.	2) Light winter grazing every other year or no grazing until the range is in good-excellent condition.	2) Grazing use slows the rate of habitat improvement.	2) Management Area "B" will be grazed only after seed-ripe of Basin wildrye. Grazing will be allowed from Aug. 15 to Dec. 31. Moderate use will be allowed.	2) Spring/summer grazing will be replaced with "winter grazing." 215 AUMs would be lost.
c) Limit utilization to moderate use.				
d) Start systems with existing livestock numbers.	3) Fence Sand Creek.	3) Grazing degrades the quality of habitat in Sand Creek.	3) Fence Sand Creek, but provide stock water.	3) Livestock water availability will be reduced along Sand Creek.
	4) Use existing allotment fences not new pasture fences.	4) Fences interfere with wildlife movement especially	4) Allow pasture fencing but use antelope fence specifications.	4) Antelope movement will be impeded & some mortality will result.
	<u>Watershed</u>			
	1) Limit grazing to allow vegetation residue & survival of grass-forbs.	1) Grazing systems can be compatible with this recommendation.	1) Management Area "A" has vegetation suitable to manage as proposed. However, live-stock will be reduced prior to system implementation.	1) 2,911 AUMs of live-stock grazing would be lost.
	2) Reduce canopy of sage-brush by burning, spraying or mechanical treatment.	2) Land treatment conflicts with wildlife, wilderness, archaeology & other resources.	2) Treat 21,000 acres to improve livestock forage & watershed conditions.	2) 5,200 AUMs would be gained.

TABLE 1-11 (Continued)
 RELATIONSHIP OF GRAZING PROPOSAL TO LAND USE PLANNING
 Long Valley/Sand Creek

Livestock Land Use Recommendations	Other Land Use Recommendations	Conflicts	Conflict Resolution	Resource Trade-Offs
	<u>Watershed (Con't.)</u>			
	3) Restrict grazing on fragile areas.	3) Grazing systems would not consider such areas.	3) Fence 50% of meadows.	3) Fragile areas would continue to degrade at a slower rate. 50% of meadows would be protected.
4) Fence Sand Creek		4) Same as 3 above.	4) Accept as recommended	4) Same as wildlife 3 above.

TABLE 1-11 (Continued)

RELATIONSHIP OF GRAZING PROPOSAL TO LAND USE PLANNING

Mosquito

Livestock Land Use Recommendations	Other Land Use Recommendations	Conflicts	Conflict Resolution	Resource Trade-Offs
1) Manage Alkali Lake & Bally Mountain #3 under custodial management. Do not regulate livestock number or season of use.	<u>Wildlife</u> 1) Enhance wildlife habitat on Bally Mtn. #1, 2, & 3 allotments by encouraging landowners to manage his land in an ecologically sound manner in conjunction with public land.	1) The area suitable for custodial use varies by specialist.	1) Management Area "A" will be managed under custodial management but season of use & utilization limits will be imposed.	1) Less control over livestock management on public lands interspersed with private land will result.
2) Manage all other allotments under systematic grazing.	2) Livestock grazing should not be allowed in critical antelope range in southern part of this sub-unit.	2) Grazing management would not eliminate livestock/antelope competition.	2) Combine livestock proposal & wildlife proposal 3C to form a 3 pasture rest/rotation grazing system. Graze 2 of 3 pastures each year May 15 - Sept. 30 to moderate use.	2) Antelope will be forced to continue to compete with livestock but to a lesser degree & livestock grazing will be reduced.
a) Provide a minimum of 2 years rest.	3) Grazing on the rest of the sub-unit should conform to one of the following grazing systems.	3) Grazing management would start with existing livestock use & begin one month earlier than recommended by wildlife.	3) Accept the range recommendations except key utilization to bitterbrush & adjust stocking levels to system & range capacities.	3) Livestock begin grazing when weight gains are high, but adjustments in stocking will reduce livestock use by 2,970 AUMs.
b) Start grazing at boot stage of key species.	a) In low sagebrush & bitterbrush habitat types use a 4 pasture rest/rotation grazing system, June 15 - Sept. 30, rest 2 pastures & limit utilization to moderate use.			
c) Limit utilization to moderate use.	b) In low sagebrush & big sagebrush habitat types (without bitterbrush) use a 2 pasture system resting half the range each year & graze from July 1 - Sept. 30 at light - moderate use.			
d) Start systems with existing livestock numbers & adjust number and season of use as required.				

TABLE 1-11 (Continued)

RELATIONSHIP OF GRAZING PROPOSAL TO LAND USE PLANNING

Mosquito

Livestock Land Use Recommendations	Other Land Use Recommendations	Conflicts	Conflict Resolution	Resource Trade-Offs
	<u>Wildlife (Con't.)</u>			
	c) In aspen, willow, bitterbrush or all habitat types graze the allotments once every 3 years from June 1 - Sept. 30 with light to moderate use.			
	4) Exclude grazing on 12 Mile Creek & Coleman creek.	4) Grazings systems will not fully protect these streams.	4) Exclude grazing on these streams.	4) 50 AUMs of grazing will be lost.
	5) Fence other riparian areas which do not respond to management.	5) Some riparian may not respond to grazing management.	5) Fence up to 50% of meadow & other riparian areas.	5) Succulent vegetation will not be available to livestock on 50% of the meadows.
	6) Exclude livestock grazing near Fee Reservoir.	6) Grazing reduces the recreational and aesthetic value of the area.	6) Rejected.	6) Ungrazed vegetation condition will not exist near Fee Reservoir.
	<u>Archaeology</u>			
	1) Manage northern portion of Hayes Canyon Range under an interim program of limited use. No increase in livestock numbers.	1) None. Grazing use will not increase.	1) N/A	1) N/A

TABLE 1-11 (Continued)
RELATIONSHIP OF GRAZING PROPOSAL TO LAND USE PLANNING

Mosquito

Livestock Land Use Recommendations	Other Land Use Recommendations	Conflicts	Conflict Resolution	Resource Trade-Offs
	<u>Watershed</u>			
	1) Fence 12 Mile Creek and Coleman Creek.	1) See wildlife (4).	1) Same	1) Same
	<u>Wild Horses</u>			
	1) Remove all livestock from New Years Lake Herd Management Area.	1) Livestock would continue to compete with horses for forage, water and space.	1) Adjust livestock use and horse numbers.	1) Grazing would be reduced by 6,000 AUMs & 41 horses would be removed from the range.

CHAPTER 2

DISCRIPTION OF THE EXISTING ENVIRONMENT

Chapter 2

DESCRIPTION OF THE EXISTING ENVIRONMENT

DATA BASE

Air Quality

A four-month record of testing for suspended particulate concentrations in 1974 at Cedarville is the only air quality data available.

Soils

The soil survey for Surprise Valley-Home Camp Area, California-Nevada, issued April, 1974, is a third order soil survey.

The Advanced (unpublished) Soil Survey Data, Washoe County, Nevada, North Part (759) (Cowhead/Massacre Planning Unit) November, 1977, provided data for ecological site determination.

Water Quality and Supply

Within the area no records of surface-flow measurements could be found. Limited surface-water quality records were for the most part over 20 years old. These analyses were not adequate by more recent standards.

Ground-water quality measurements for the limited area of the Surprise Valley are the only adequate ones for the study area. There are no adequate records of ground-water recharge.

Vegetation

The livestock carrying capacity of the study area was assessed during an ocular reconnaissance range survey in 1963 and during condition and trend studies in 1977. The 1963 range survey indicated the livestock carrying capacity to be 49,329 AUMs. Reductions in grazing use from 20-73 percent were recommended to bring grazing in line with capacity. Reductions were to be taken in three-year increments. Field checks during the second and third years were made to determine if the entire reduction would be necessary. Recommendations that the entire reduction not be imposed on some allotments and failure to make further reductions as recommended on other allotments resulted in a final stocking level of 59,924 AUMs, approximately 18 percent above the original surveyed capacity.

During 1977, 142 condition transects and 45 trend transects were conducted on the study area. The data provide an adequate description of average vegetative conditions on a study-area basis. They provide an adequate representation of present composition of individual ecological sites, which allows assessment of responses to various intensities of livestock use or to different management proposals or grazing systems.

Data on range condition or carrying capacity are never absolutely correct since rangelands are changing constantly. The present estimated carrying capacity of livestock and wild horses is 66,838 AUM's. This is based upon actual use and utilization studies for the 1979 grazing season. Utilization figures are based upon the most palatable species in each allotment and were adjusted to a median precipitation basis. Present grazing use by livestock and wild horses combined is 72,352 AUM's. Present use exceeds the estimated carrying capacity by 5,514 AUM's. This results in utilization levels exceeding the safe use levels of the key species.

The 1963 range survey and studies conducted in 1977 and 1979 provide an estimated carrying capacity as well as an insight into causes of current range conditions but they are not used directly to derive proposed stocking rates. As stated in Chapter 1, proposed stocking rates are determined by assessing current actual use and forage utilization versus desired utilization levels, number of pastures which would be grazed under any given grazing system, and increased forage production which would be obtained by later turnout dates.

Present utilization, which among other factors, serves as the basis for calculation of existing carrying capacity and proposed stocking rates, was determined by the key forage plant method (BLM Manual 4412) during the 1979 season. The data were adjusted to a median crop year basis using the procedure of Sneva and Hyder (1962). This allowed removal of much of the annual variation due to the weather. The utilization data are considered adequate for establishing stocking rates, which will allow assessment of economic as well as environmental impacts. Additional utilization and actual use studies will be conducted during 1980 and beyond to substantiate utilization estimates and to refine initial stocking rates prior to implementation of grazing systems.

Livestock Grazing

Present seasons of use and numbers of livestock were taken from annual grazing licenses. Total allowable active use is based on a range survey conducted in 1963 and a subsequent adjudication of grazing privileges among range users.

Typical ranch operation data as well as average calf and lamb weaning weights are based on information provided by the Modoc County Farm Advisor's Office.

Estimates of future livestock performance and livestock herding and handling requirements are based on documented research studies, consultation with area ranchers, and personal observations of grazing systems developed throughout the Bureau.

Estimates of future livestock numbers and use are based on estimates of forage production under improved range conditions (see Vegetative Data Base).

Wildlife

Data on current populations of game species were provided in reports of the California and Nevada Departments of Fish and Game. Population estimates and distribution patterns were based on analysis of harvest data, biannual aerial surveys, annual brood counts, raptor surveys, and other periodic inventories.

A modified version of the Selleck/Hart formula was used to calculate deer numbers, aerial survey data were used to estimate antelope numbers, and harvest data were analyzed to estimate sage grouse populations (Nevada Dept. Fish and Game, 1978). The BLM conducted aerial and ground raptor nesting surveys in 1975-1978 and nongame species inventories in 1977 in Cowhead/Massacre. Nongame wildlife populations and habitat structure were examined in 1977 on grazed habitat in the shadscale, greasewood, low sagebrush, big sagebrush, mountain mahogany, silver sage, meadow, aspen, baltic rush, white fir, and riparian vegetation associations to verify species occurrence. Ungrazed examples of seven of the habitat types were examined as a basis of comparison for impact predictions. The types sampled were shadscale, greasewood, low sagebrush, big sagebrush, meadow, aspen and riparian vegetation. Stream surveys were conducted on eight streams in 1977, a drought year.

Wild Horses and Burros

Current wild horse populations, herd locations, and population increases are based on aerial inventories conducted in 1973, 1974, 1975, 1977, and 1979. Inventories provided the size and location of individual herds as well as the number of adult and young horses. Wild horse movement and behavioral patterns are based on field observation by BLM personnel.

The forage preference of wild horses was determined by a dietary analysis study conducted immediately adjacent to the study area in 1976 and 1977. Forage availability and vegetative composition are similar on both areas. Monthly dietary preference is based on the relative composition of vegetative species present in fecal samples collected each month for one year.

Cultural Resources

While limited excavations in the High Rock Sub-Unit (Layton, 1970, 1972) and on private lands in Surprise Valley (O'Connell, 1971, 1975; O'Connell and Hayward, 1972) defined a general chronological framework for prehistory, and, while both studies were accompanied by intuitively based site surveys, no sustained research had ever objectively addressed the question of where sites are located in the study area in relation to environmental zones. Accordingly, BLM surveys in 1977 approached this question from the perspective of several independent ground reconnaissances.

Of the total public land base, 4.4 percent was surveyed (35,137 acres). Of this, 14,080 acres (1.8 percent of the study area) were surveyed in the context of a stratified, random sample, designed to allow probabilistic statements on the distribution of sites relative to pre-grazing biotic communities ("ecological sites," see Vegetation, below). Additionally, a purposive survey designed to collect specific categories of data explored 4,089 acres of spring-based settings, and 9,848 acres of canyonlands and lake margins were given intensive scrutiny. Independent BLM project-related intensive surveys of 7,120 acres provided a field for the testing of site-occurrence predictions generated by the probabilistic sample.

The BLM staff have so far recorded 595 sites. In each case, data have been collected on location, size, artifact constituency, time markers, condition, and further research potential.

Recreation

No studies have analyzed recreational use within the study area. Applicable literature is limited to hunting surveys conducted by the Nevada Department of Fish and Game, 1977, and the Bureau of Land Management, 1973; user distribution, preference, and growth-rate surveys conducted by the State of Nevada, 1977, and Woody, 1968.

Peak user period inventories, coupled with trend comparison for adjacent lands in northwestern Nevada, were used as the basis for projections of recreational user levels, distribution, and increases stated in this analysis. These figures indicate general user quantities and ranking of activity popularity among the entire recreational population which frequents the study area.

Development of the Recreation and Visual Resources portions of this report utilized these findings in combination with BLM Manual and Instruction Memorandum procedures and directives. The literature cited provides the data base from which recreational user characteristics and values were established. Visual Resource Management (VRM) classifications were established through BLM's VRM inventory techniques.

Wilderness

Section 603 of the Federal Land Policy and Management Act (FLPMA) directed the Bureau to review all public land roadless areas of 5,000 acres or more having wilderness characteristics; determine their suitability or non-suitability for wilderness designation; and report these recommendations to the President no later than October 21, 1991.

In determining wilderness values, the law directs the Bureau to use the criteria given by Congress in the Wilderness Act of 1964. Congress defined wilderness as an area of undeveloped Federal land which: (1) generally appears to have been affected primarily by the forces of nature; (2) has outstanding opportunities for solitude or a primitive and

unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value. The framework the Bureau developed to accomplish the Wilderness Review Program has three phases: inventory, study, and reporting to Congress. The inventory phase involves identifying roadless areas meeting wilderness criteria established by Congress as Wilderness Study Areas (WSA's). The study phase involves the process of determining WSA's suitability or non-suitability for wilderness designation. The reporting phase consists of reporting the recommendation through the Secretary of the Interior and the President to Congress.

To date only the inventory phase of the wilderness review program has been initiated and mostly completed for the Cowhead/Massacre Planning Unit.

The Cowhead/Massacre Planning Unit contains 769,000 acres of public land inventoried for wilderness characteristics according to the Bureau's adopted guidelines and policy. These lands fall within the following wilderness inventory categories:

WSA

Public land roadless area assessed as possessing the roadless and wilderness characteristic criteria required for Wilderness Study Area identification. These lands will receive wilderness study and will be managed in the interim in a manner that does not impair wilderness suitability according to the Bureau's Interim Management Policy.

Non-WSA

Public land roadless area assessed as not possessing wilderness characteristic criteria required for Wilderness Study Area identification. These lands are released from the management restrictions imposed by the Bureau's Interim Management Policy.

Inventory

Public land roadless area currently under review for wilderness characteristics. Lands are managed in a manner that does not impair wilderness suitability according to the Bureau's Interim Management Policy until released from the wilderness review process.

Appeal

Public land roadless area assessed as not possessing wilderness characteristics criteria required for Wilderness Study Area identification. However, the non-WSA decision has been appealed to the Interior Board of Land Appeal (IBLA). Lands are managed in a manner that does not impair wilderness suitability according to the Bureau's Interim Management Policy pending a decision by IBLA.

WSA

Four roadless areas totalling 181,165 acres are identified as WSA. They will be studied for potential wilderness designation. These include:

Yellow Rock Canyon	CA-020-913A	13,050 acres
High Rock Canyon	CA-020-913B	33,985 acres
Sheldon Contiguous	CA-020-1012	24,130 acres
Massacre Rim	CA-020-1013	110,000 acres

Inventory

Seven roadless areas comprising 142,315 acres are currently under review for wilderness characteristics. These areas share common boundaries with either the Winnemucca (Nevada) or the Lakeview (Oregon) District. The preliminary inventory recommendation for the areas is that two be identified as WSA as they meet the required wilderness characteristic criteria and that the other five be identified as non-WSA as they were assessed as not meeting the outstanding opportunities for solitude or primitive recreation criterion and in some cases the natural condition criterion. A final inventory decision for the seven units is not anticipated until November, 1980.

The two roadless areas with preliminary recommendation as WSA are:

<u>Unit Name</u>	<u>Unit Number</u>	<u>Susanville Administered Acres</u>	<u>Total Public Acres</u>
Little High Rock	CA-020-913	44,870	53,573
E. Fork High Rock Canyon	CA-020-913	46,450	53,920

Appeal

An appeal affecting 126,235 acres of public land assessed as not meeting the 5,000 acre minimum size criteria required for wilderness study has been filed with IBLA. The nature of the appeal is that those public lands less than 5,000 acres in size but contiguous to United States Forest Service (USFS) RARE II should be studied jointly with the RARE II land. This is contrary to the Bureau's policy being that only those public land contiguous to RARE II designated for wilderness or future planning be identified for wilderness study.

Non-WSA

Over 353,000 acres of the planning unit was assessed as not meeting the wilderness characteristic criteria required for WSA identification. Eighteen (18) roadless areas totalling 200,251 acres were assessed as not meeting the outstanding opportunities for solitude or primitive and unconfined type of recreation criterion. Additionally, some of these roadless areas were assessed as not meeting the natural condition criterion.

An additional 152,820 acres comprising 158 parcels were removed from wilderness consideration due to insufficient size. The parcels varying in size from less than 40 acres to 4,900 acres consist mainly of small parcels separated from other public land by roads and private land. They did not meet the 5,000 acre size criteria established by Congress or any of the Bureau's exemptions to the size criteria required for wilderness consideration.

Social and Economic Conditions

Analysis of social and economic conditions was based upon government statistics and reports, expert opinion, and various journal articles.

The primary sources for demographic data were government documents. Population and employment statistics were derived from the Federal Bureau of the Census, several California agencies, and Modoc County's Department of Public Works. Confidence in the data is relative to the methods of compilation: census data acquired from direct surveys is presumed to be more accurate than county and State trend projections. However, for the purpose for which these data are employed, moderate inaccuracies will not distort conclusions drawn from this data.

Livestock industry analysis was based partly upon the Livestock Operator Dependency Analysis, Cowhead/Massacre Planning Area (Centaur Management Consultants, Inc., 1978). In early interviews with the permittees, several errors were found in this consultant prepared document. Hence, personal interviews were held with 22 of the unit's 34 ranchers. Discrepancies between the report and the ranchers' actual operations were thus corrected. The SCS supplied much of the information concerning individual permittees reported in the Operator Analysis. However, the fluctuations in some of the variables the SCS reports (e.g., herd size, actual as opposed to licensed numbers of livestock on Federal range) creates a major problem in analysis.

These various sets of data are the best presently available information, but the analysis of rancher dependency on BLM forage presented in the EIS should be considered an estimate rather than an absolute.

DETAILED DESCRIPTION OF THE ENVIRONMENT

General Features

Topography/Geology

The most prominent physiographic features of the study area are the Warner Mountains, west of Surprise Valley, and the Hays Canyon Range, east of Surprise Valley. Their crests range between 7,000-10,000 feet and are at least 2,500 feet above adjacent valley floors. Most of the valleys are enclosed basins, receiving all of the drainage from surrounding mountains. The major valleys, Surprise Valley and Long Valley, serve as catchment basins for streamflow from surrounding mountains. The valley floors are characterized by playas which collect excess runoff during periods of above-normal precipitation.

A resistant layer of basalt caps the surface throughout much of the area and overlies tuffs and agglomerates that are more susceptible to erosion. The resultant topography is characterized by relatively flat or gently rolling upland surfaces dissected by vertical canyon walls.

Climate

Annual precipitation in the planning unit ranges from six inches to 28 inches and averages 11 inches. Eighty-five percent of the area receives between 8-14 inches. Local weather records show that 5 percent of the winter storms exceed 1 inch per day, and 5 percent of summer storms exceed 1.25 inches per day (King and Snyder, 1957).

The growing season, as defined by 30 degrees Fahrenheit temperatures in the spring and fall, ranges from 40 days in the eastern part of the planning unit to as much as 130 days in the Cedarville area. Median dates of the last 32 degrees Fahrenheit temperature reading in the spring ranged from late May to late June, while the first freeze in the fall occurs in early August near Sheldon and in late September near Cedarville.

Air Quality

Ambient air quality in the Cowhead/Massacre Planning Unit is excellent. The only primary pollutant in the planning unit is suspended particulates resulting from wildfires, prescribed burns, and dust. However, total suspended particulate levels are suspected of being well below the California State Primary Ambient Air Quality Standard of 100 micrograms per meter cubed (annual geometric mean). Suspended particulate matter measured at Cedarville, the only urban center within the planning unit, during June-October, 1974, revealed a mean value of 38.7 micrograms per meter cubed for the monitoring period.

Field observations within Cowhead/Massacre indicate that areas adjacent to lakes and playas are sources of suspended particulates. During March and April, concentration of suspended particulates in such areas frequently exceeds the California standard of 100 micrograms per meter cubed.

No air-quality parameter other than suspended particulate matter has been evaluated for the study area. No exceedence of State ambient air-quality standards has been documented.

The South Warner Wilderness Area (a Federal Class I area, as classified by the Clean Air Act Amendments of 1977, PL 95-95), is located 15-20 miles west of the Cowhead/Massacre Planning Unit.

Soils

A modern soil survey for a portion of this area has been published (Summerfield, 1974). The entire area has been mapped as a third order soil survey by the U. S. Soil Conservation Service.

Soil Erosion

Both wind and water erosion are active within the area. Lakes and playas are especially subject to wind erosion because the surface soils are single-grained. Many of these soils are sands and fine sand loam. These lakes and playas are thus the primary source of suspended particulates in the study area. However, because of the relatively short distances the wind is able to travel within each eroding area, wind erosion is of minor importance throughout the entire EIS area. Water erosion is much more prevalent.

There are three levels of erosion hazard related to soil characteristics: slight, moderate, and severe.

Slight erosion hazard: Minor sheet and/or rill erosion may take place. These soils are frequently sandy loam profiles occurring on gentle slopes. They drain very well and store water readily. Potential erosion is not significant enough to reduce productivity.

Moderate erosion hazard: Greater amounts of sheet and rill erosion may take place. These soils occur on moderate slopes and exhibit only moderate water infiltration/percolation rates and storage capacity. Potential erosion is significant enough to reduce but not eliminate productivity.

Severe erosion hazard: Loss of surface soil can be very high. The soil is frequently shallow to bedrock, containing very unstable aggregates and restrictive layers. Soil moisture storage capability is low and infiltration/percolation rates are slow. Slopes are steep to very steep. Potential erosion will cause a substantial reduction in productivity.

Of the public lands within the planning unit, 83 percent are in the slight erosion hazard class while 16 percent are in the moderate erosion hazard class. The remaining 1 percent are unclassified. Of this remaining 1 percent, it is estimated that 1-2 percent are in the severe erosion hazard class.

The Pacific Southwest Interagency Committee classification of sediment yield (PSIAC, 1968) (TABLE 2-1) has been used to determine soil erosion for each sub-unit (TABLE 2-2) and each ecological site (TABLE 2-3).

Approximately two-thirds of the ecological sites in Cowhead/Massacre fall in Classes 4 and 5. Class 4 is generally considered to be the approximate normal rate of geologic erosion for the majority of Great Basin soils. Accelerated erosion is likely to be a problem only in those areas that have been heavily grazed.

Water Quality

King (1971) has estimated that on the average only 4 percent of the precipitation flows over the surface as runoff, less than 1 percent moves into ground water, and the remaining 95-96 percent evaporates. This is a generalization for a wide range of conditions and is assumed to be true for the Cowhead/Massacre area. Even under favorable conditions the percentage of precipitation that recharges the ground-water reservoir is small and, for a given amount of precipitation, varies considerably with the terrain. Rough estimates, based on empirical methods devised by Eakin and others (1951), of the amount of water which annually recharges the aquifers of the region indicate that 7 percent of the precipitation in the 12- to 15-inch zone and 3 percent in the 8- to 12-inch zone are presumed to reach the water table. Where precipitation is less than 8 inches, the recharge is assumed to be negligible. These assumptions in the Long Valley-Massacre Lake region provide the basis for the estimates of recharge. Sinclair (1963) estimated the yield of ground water in Long Valley to be 10,000 acre-feet annually, in Massacre Lake Valley 3,000 acre-feet annually, and in Mosquito Valley 1,500 acre-feet annually. There has been no direct measurement of runoff within Cowhead/ Massacre .

Only 7 percent of the Cowhead/Massacre area shows moderate erosion. This high degree of soil-vegetation stability results in good to excellent surface-water quality. Scattered observations in this area by the California Department of Water Resources confirm good to excellent surface-water quality.

Ground water has been a major source of water for domestic consumption, animal watering, and irrigation. Based on sampling from five wells and one spring, Sinclair (1963) concluded "that the water is of good chemical quality and is suitable for irrigation and domestic use." However, two of these wells contained 215 and 70 parts per million of nitrate, respectively, concentrations well in excess of the recommended 10 parts per million limit for public drinking water established by the

TABLE 2-1

PSIAC Classification of Sediment Yield

Class	Rating	<u>SEDIMENT YIELD</u>	
		Ac. Ft/Sq. Mi.	Tons/Ac.
1	100	3.0	9.3
2	75 - 100	1.0 - 3.0	3.1 - 9.13
3	50 - 75	0.5 - 1.0	1.5 - 3.1
4	25 - 50	0.2 - 0.5	06. - 1.5
5	0 - 25	0.2	0.6

Source: Pacific Southwest Interagency Committee, 1968.

TABLE 2-2

Erosion rates in the Cowhead/Massacre Planning Unit

<u>Sub-Unit</u>	<u>Erosion (Ton/Acre/Year)</u>
1	.9
2	1.3
3	1.1
4	1.3

TABLE 2-3
CALCULATED EROSION BY ECOLOGICAL SITE

Ecological Site Number	Name and Major Vegetative Species at Climax	P R E S E N T %		C O N D I T I O N %		Calculated Soil Erosion T/AC
		Shrubs	Grass	Forb	Bareground	
1	Shadscale/Indian Ricegrass	23	1	1	65	1.6
2	Greasewood/Basin Wildrye	18	1	1	67	0.6
3	Greasewood-Rabbitbrush/Basin Wildrye	Unknown				
4	Low Sagebrush/Sandberg Bluegrass	18	7	7	45	1.6
5	Low Sagebrush/Bluebunch Wheatgrass	25	7	6	45	1.3
6	Low Sagebrush/Idaho Fescue	Unknown				
7	Juniper-Low Sagebrush/Bluebunch Wheatgrass	24	9	4	38	1.3
8	Big Sagebrush/Bluebunch Wheatgrass-Indian Ricegrass	25	1	3	62	1.8
9	Big Sagebrush/Bluebunch Wheatgrass	24	3	2	50	1.8
10	Big Sagebrush/Idaho Fescue	Unknown				
11	Big Sagebrush/Basin Wild rye	24	1	4	54	0.6
12	Juniper-Big Sagebrush/Bluebunch Wheatgrass	10	12	15	21	2.1
13	Bitterbrush/Idaho Fescue	27	12	4	33	1.3 (Estimated)
14	Curlleaf Mountain Mahogany/Western Needlegrass	Unknown				
15	Silver Sagebrush/Mat Muhly	26	1	1	55	1.8 (Estimated)
16	Baltic Rush	Unknown				
17	Aspen/Slender Wheatgrass	6	15	2	8	0.5 (Estimated)
18	Tufted Hairgrass-Bluegrass	-	36	6	45	0.6 (Estimated)
19	Willow/Tufted Hairgrass-Bluegrass	-	48	6	24	0.6 (Estimated)
	Rubble - Rock Outcrop - Dry Lakebeds and Miscellaneous					0.5 (Estimated)

California Department of Health. Other ground-water analyses from the California Department of Water Resources indicate that approximately 10 percent of the ground water sampled in the study area is high in nitrate.

Vegetation

Twenty ecological sites were identified (TABLE 2-4). Ecological sites are biotic communities with specific physiographic, climatic, soil, and vegetative characteristics.

Since species composition of sites changes with changes in condition class or successional stages, the same ecological site will have varied appearances related to various sub-climax states. In other words, a big sagebrush/bluebunch wheatgrass site in "poor" condition may contain very little or no bluebunch wheatgrass.

Undisturbed climax stands are presently rare in the study area. The major disturbance factors responsible for the retrogression of most sites have been livestock grazing, increasing wild horse populations, and the control of natural fires. The effects of these have been the reduction of major perennial grasses and forbs and an increased abundance of shrubs.

APPENDIX C describes the physiographic location, soil characteristics, representative soil series, climax vegetation, and present vegetation of each site. Unless otherwise noted, information is based on SCS soil survey information (USDA, SCS, 1977), Range Site Handbook for the High Desert Resource Province-Oregon (Anderson, 1978), and BLM-conducted studies. Information on the present vegetative condition and trend was derived from a BLM vegetation inventory and survey conducted in 1977 (APPENDIX B). The major vegetation associations are shown on MAP 2-1.

The vegetation of Sub-Unit 1 is dominated by the low sagebrush/Sandberg bluegrass and low sagebrush/bluebunch wheatgrass sites. The vegetation along the bottoms of High Rock Canyon, which bisects the area, is dominated by the big sagebrush/basin wild rye site. This site appears to be in better condition than the study area average of poor; probably because of recent cattle nonuse and the fact that sheep do not congregate along water as do cattle in other areas.

The vegetation of Sub-Unit 2 is dominated by the low sagebrush/Sandberg bluegrass site and several big sagebrush sites. The bitterbrush/ Idaho fescue site occurs on the higher elevational portions of the area.

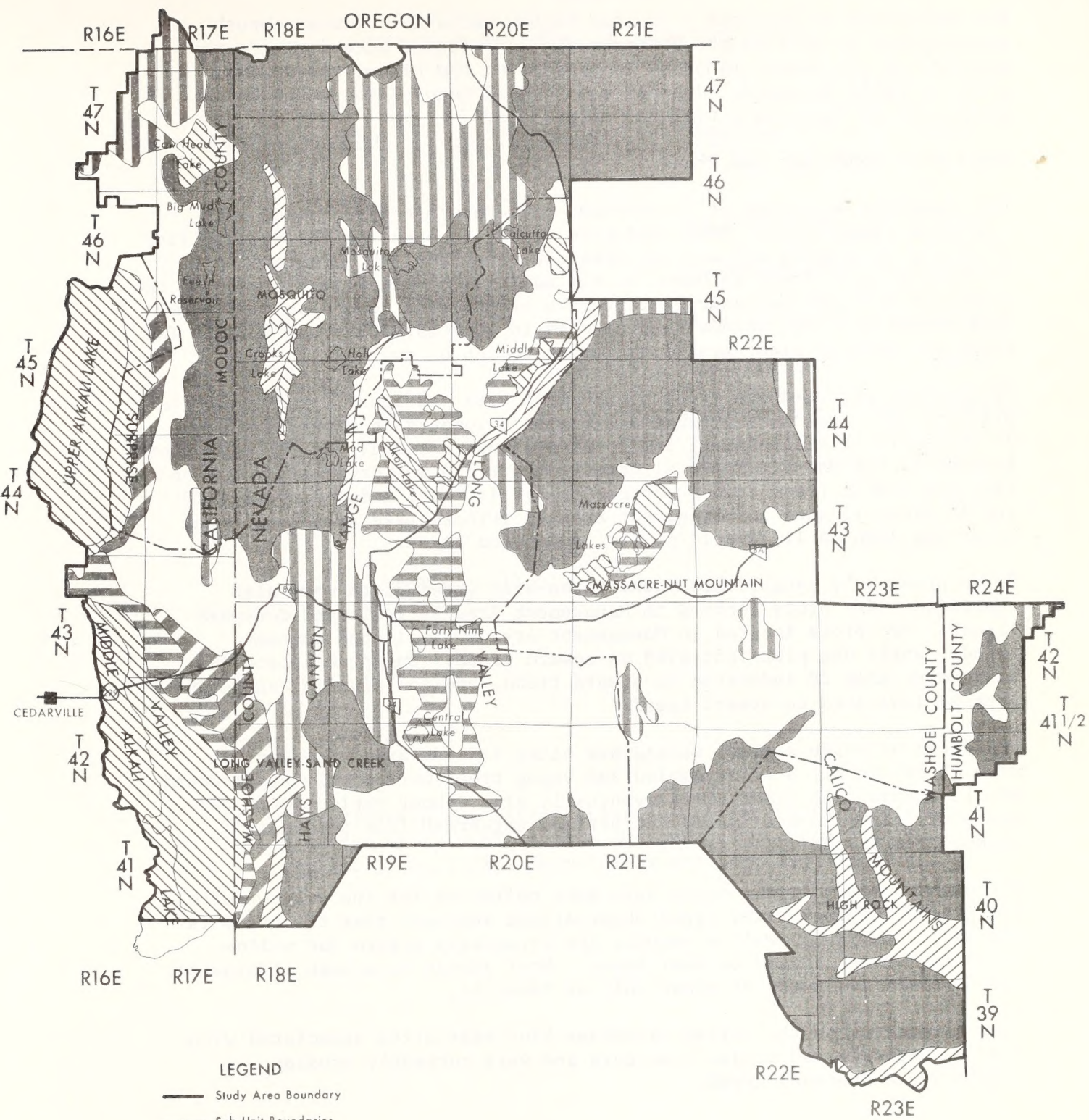
The vegetation of Sub-Unit 3 is highly variable. The western portion supports the shadscale/Indian ricegrass and greasewood associations. The central area along the Forty-nine Mountain Range is dominated by big sagebrush associations and the bitterbrush/Idaho fescue site. The eastern portion, which contains Long Valley, is dominated by the greasewood associations and the big sagebrush/ basin wild rye site. Long Valley is presently shrub dominated with only remnant stands of basin wild rye. Historically, it was used by early ranchers for winter grazing. In 1871, 10,000 to 12,000 steer were wintered on nothing but basin wild rye (Lesperance, et al, 1975, from Hazelton, et al, 1961).

TABLE 2-4

ECOLOGICAL SITES OF THE CONHEAD/MASSACRE AREA

Associations	Ecological Site Number	Name and Major Vegetative Species at Climax	Percent of Area	Present Condition	% of Climax
Shadscale	1	Shadscale/Indian Ricegrass	3%	Poor	11
Greasewood	2	Greasewood/Basin Wild rye	4%	Poor*	11
	3	Greasewood-Rabbitbrush/Basin Wild rye	1%	Poor*	Estimate
Low Sagebrush	4	Low Sagebrush/Sandberg Bluegrass	20%	Fair	49
	5	Low Sagebrush/Bluebunch Wheatgrass	12%	Fair	32
	6	Low Sagebrush/Idaho Fescue	1%	Fair	Estimate
	7	Juniper-Low Sagebrush/Bluebunch Wheatgrass	6%	Poor	10
	8	Big Sagebrush/Bluebunch Wheatgrass-Indian Ricegrass	6%	Fair	27
Big Sagebrush	9	Big Sagebrush/Bluebunch Wheatgrass	9%	Poor	15
	10	Big Sagebrush/Idaho Fescue	1%	Fair*	Estimate
	11	Big Sagebrush/Basin Wild rye	9%	Poor	18
	12	Juniper-Big Sagebrush/Bluebunch Wheatgrass	5%	Fair	26
	13	Bitterbrush/Idaho Fescue	12%	Poor	16
Mountain Mahogany	14	Curleaf Mountain Mahogany/Western Needlegrass	1%	Fair*	Estimate
Silver Sagebrush	15	Silver Sagebrush/Mat Muhly	1%	Fair*	Variable
Baltic Rush	16	Baltic Rush	1%	Fair*	Estimate
Aspen	17	Aspen/Slender Wheatgrass	1%	Poor	8
Bluegrass-Sedge	18	Tufted Hairgrass-Bluegrass	1%	Poor	14
	19	Willow/Tufted Hairgrass-Bluegrass	1%	Poor	18
	20	Rubbleland - Rock Outcrop - Dry Lakebeds and Miscellaneous	12%		

* Condition class has been estimated.



MAP 2-1

The vegetation of Sub-Unit 4 is also highly variable. Low sagebrush associations as well as the bitterbrush/Idaho fescue site dominate the majority of the area. Mahogany is present on the higher elevational areas of Bally Mountain. Juniper has invaded many of the sites and gives much of the area a timbered appearance.

Vegetative Condition and Trend

The condition and trend of 13 antelope bitterbrush browse ranges were evaluated (TABLE 2-5). This condition rating is based on the availability of browse to grazing animals and does not represent any relationship to site potential. Trend is based on the addition of new browse plants to the stand and does not necessarily reflect a progression toward or away from site potential. All stands sampled were in unsatisfactory condition. The trend was down on nine, static on three, and up on one.

Twenty-five stereo-photo trend plots which were previously established in existing AMP areas were evaluated. One plot located in Management Area 2B (Massacre Lake Allotment) indicated a downward trend. Of the nine plots located in the Massacre Lake Allotment, the trend was down on six, up on two, and static (less than 5 percent change in trend index) on one. Of the 15 plots located in Management Area 4B (Crooks Lake Allotment), the trend was down on 11, static on one, and up on three.

Seven previously established Parke-three-step trend plots were also evaluated. Two plots located in Management Area 3B indicated downward trends. Two plots located in Management Area 4C indicated downward trends, while one plot indicated an upward trend. One plot located in Management Area 2E indicated an upward trend, and one plot in Management Area 4B indicated an upward trend.

The trend of aspen/slender wheatgrass sites is downward. New sprouts were absent in all stands sampled and young trees were poorly represented in all stands. As older trees eventually die without replacement, the overstory canopy opens up and juniper and sagebrush from adjoining communities invade.

Although no quantitative trend data were collected for the willow/tufted hairgrass-bluegrass site, field observations indicate that the trend is presently downward. Willow sprouts are repeatedly grazed and willow regeneration is limited on most sites. Most stands have been eliminated, are severely degraded, or occur only as remnants.

Over 50 percent of the tufted hairgrass-bluegrass sites associated with meadow complexes had active head cuts and were currently eroding, indicating a downward trend.

TABLE 2-5

CONDITION AND TREND OF BROWSE TRANSECTS

<u>Management Area</u>	<u># of Transects</u>	<u>Condition</u> ^{1/}	<u>Trend</u>
2A	1	Unsatisfactory	1 Down
2E	4	Unsatisfactory	4 Down
3A	1	Unsatisfactory	1 Static
3B	1	Unsatisfactory	1 Down
4A	1	Unsatisfactory	1 Static
4C	5	Unsatisfactory	1 Up 1 Static 3 Down
TOTAL		13	

^{1/} The criterion for differentiating between satisfactory or unsatisfactory condition is whether or not more than 15 percent of available individuals are heavily hedged.

In summary, existing data indicate that the majority of the study area was in a downward trend when inventories were conducted during 1977. This does not necessarily reflect a long-term downward trend on most ecological sites. With the exception of the aspen, meadow, and willow communities, data probably reflect a short-term downward trend resulting from the two-year drought which occurred during 1976 and 1977.

Vegetative Production

Livestock forage production has been assessed using two different methods. One utilizes initial stocking rate guides for ecological sites (Anderson, 1978), and the other utilizes livestock actual use and utilization data. The actual use method was used to establish initial stocking rates because it provides a direct approach to achieving land use objectives (i.e., attainment of specific and often varying utilization levels within use pastures) and given the level of vegetation sampling was felt to be the most accurate.

Anderson's stocking rate guides are used to establish the level of increased forage that can be expected if the condition class of ecological sites is improved. They are used in combination with the actual use method to determine anticipated livestock use in 20 years.

Both methods allow livestock forage but not total vegetative production to be determined. Anderson's guides provide initial stocking rates for cattle and horses and the actual use method only assesses the production of the major forage species utilized by livestock. Total vegetation produced is likely several times higher than livestock forage production.

Livestock forage production is expressed by the amount of AUMs that would be available at 50 percent utilization levels. For example, if 100 AUMs of use on an area results in 25 percent utilization, the estimated forage production is 200 AUMs. This allows the production of different areas to be compared even though the present or proposed utilization levels of the areas may be different. The estimated forage production of the study area, given the present seasons of use and grazing patterns, is approximately 68,600 AUMs (TABLE 2-6). As will be discussed in Chapter 3, the production of these areas will vary with proposed changes in livestock management.

Threatened and Endangered Plant Species

A literature search was conducted to assess the known location and range of plants which have been listed by the U. S. Fish and Wildlife Service (Federal Register, vol. 40, no. 127, July 1, 1975; and Federal Register, vol. 41, no. 117, June 16, 1976, which expired November 10, 1979), plants listed in the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California (1974) and plants listed in the Northern Nevada Native Plant Society's publication Nevada's Threatened and Endangered Plant Map Book (1978). This literature search revealed several threatened and endangered plant species occur near the study area but none had been located within the study area boundary.

TABLE 2-6

EXISTING LIVESTOCK FORAGE PRODUCTION^{1/}

<u>AREA</u>	<u>AUMs</u>
Sub-Unit 1	10,848
<u>Sub-Unit 2</u>	
Management Area A	1,742
Management Area B	2,077
Management Area C	1,617
Management Area D	400
Management Area E	<u>17,155</u>
TOTAL	22,991
<u>Sub-Unit 3</u>	
Management Area A	5,100
Management Area B	<u>6,424</u>
TOTAL	11,524
<u>Sub-Unit 4</u>	
Management Area A	3,750
Management Area B	6,430
Management Area C	<u>13,295</u>
TOTAL	23,475
STUDY AREA TOTAL	68,838

^{1/} Estimated forage production under present management.

Endangered and threatened species survey and clearance of potential vegetative treatment areas done in the summer of 1979 revealed the presence of two species, Cordylanthus capitatus and Galium glabrescens ssp. modocense within the same potential treatment area near Twelve Mile Creek. This is in Sub-Unit 4, Mosquito.

Draba Douglasii (listed as threatened in Federal Register, vol. 40, no. 127) is known to occur within five miles of the southern and north-eastern boundary of the study area. This species is a perennial herb in the mustard family. It occurs on rocky low sagebrush sites similar to those occurring throughout the study area boundary. This plant has been deleted from Nevada's Threatened and Endangered list and placed on the lesser status Species of Concern List since this plant has been found to be much more common than suspected. California has it listed as "plants not vulnerable but rare enough to require close monitoring."

Silene scaposa var. lobata (listed as threatened in Federal Register, vol. 40, no. 127) is also known to occur within five miles of the north-eastern boundary of the study area. This species occurs on rocky sagebrush flats of both low and big sagebrush. It is likely that this species occurs within the study area boundary. This plant is on the Northern Nevada Native Plant Society's list in the Threatened and Endangered Plant Map Book.

Galium serpicum ssp. warnerense (listed as threatened on 1975 Federal Register list and on the main list of the California Native Plant Society), Penstemon cinicola (listed as threatened on 1975 Federal Register list and on the main list of the California Native Plant Society), and Cryptantha subretusa (listed on the California Native Plant Society's list of plants of concern but not rare outside of California) are all known to occur within five miles of the study area in the Warner Mountains. They are all associated with forested sites and are unlikely to occur within the study area.

As stated earlier, Galium glabrescens ssp. modocense (listed as endangered on 1975 Federal Register list and on the main list of the California Native Plant Society) and Cordylanthus capitatus (listed on the California Native Plant Society's list of plants of concern but not rare outside of California), both occur on public lands within the study area in the ecotone between the forested type and the sagebrush-juniper type near Twelve Mile Creek. Since they both are usually associated with or near the forested area at higher elevations, it is unlikely that they would occur anywhere else in the study area other than this western edge.

Dimeresia Howellii occurs near the study area on the Sheldon Antelope Refuge and Range but is not a Nevada listed plant. It was previously listed by Oregon and is on a California Native Plant Society list. There are no known sitings on the California portion of the study area but habitat for it does exist. The plant occurs on dry gravelly soils in the sagebrush scrub community.

These are the only known occurring listed species in and near the study area. Habitat does exist for a few other listed species although there are no known locations near the study area. These species will be noted during any inventories in the study area. Camissonia minor, Carex Sheldonii, Castilleja psittacina, Erigeron elegantulus, Muilla transmontana, Penstemon cinereus, and Phacelia inundata are some of those species, most of which are on a California Native Plant Society list.

Livestock Grazing

The largest landowner within the planning unit is the Federal Government. Over 70 percent of the land area is managed by the BLM.

The dominant use of lands within the planning unit is agriculture. Ranchers utilize public lands for spring, summer, and fall grazing, while devoting their base properties to pasture, hay, and grain production.

The Modoc County Department of Agriculture inventoried the 93 ranches throughout the Surprise Valley in 1974. The dominant role of livestock in the valley's agricultural industry is reflected by the importance of pasture and hay crops grown in the valley (see TABLE 2-7).

More intensive crop production in the Surprise Valley may be limited in the future by water supplies. Recent overdrafts of the ground-water basin, coupled with the 1975-1977 drought, have resulted in an average drop of four feet per year in the water table since 1975.

In order to establish a sustainable increase in irrigated crop production, it would be necessary to more efficiently use currently available water supplies, to increase the storage capacity for runoff waters, and/or to increase percolation into the ground-water basin. If present patterns of use continue, the valley's water supply may run out or become unavailable from all but the deepest wells (McKenzie, 1977).

Thirty-five livestock operators graze approximately 15,000 cattle and 2,000 sheep on the 35 allotments presently existing on the study area. Cattle are generally wintered on base ranches in Surprise Valley and trailed to BLM lands during the early spring, where they remain until mid- or late summer. Most operators have cow-calf operations. They generally calve during the spring months prior to going to BLM ranges. Calves generally weigh approximately 375 to 400 pounds when they are weaned, during the fall (Pierce, personal communication, 1978). Livestock utilize private pastures and crop aftermath for fall feed. MAP 2-2 delineates the allotments in the study area.

Sub-Unit 1, High Rock

Two livestock operators graze sheep and cattle on portions of two allotments in this area (TABLES 2-8 and 2-9).

TABLE 2-7

SURPRISE VALLEY RANCHES - CROP ACREAGES (1974)

	<u>Acres</u>
<u>Cropland</u>	
Irrigated Pastures	16,515 ^{1/}
Alfalfa Hay	12,847 ^{2/}
Other Hay	19,620
Grain	2,758
Idle	<u>2,509</u>
Total Cropland	54,249
Non-Irrigated Pasture	<u>50,475</u>
Total Acres	104,724

Source: Modoc County Department of Agriculture, 1975.

^{1/} 1977 estimate = 12,400 acres.

^{2/} 1977 estimate = 15,500 acres. In partial response to higher prices for alfalfa, acreages devoted to alfalfa have increased 21 percent since 1974.

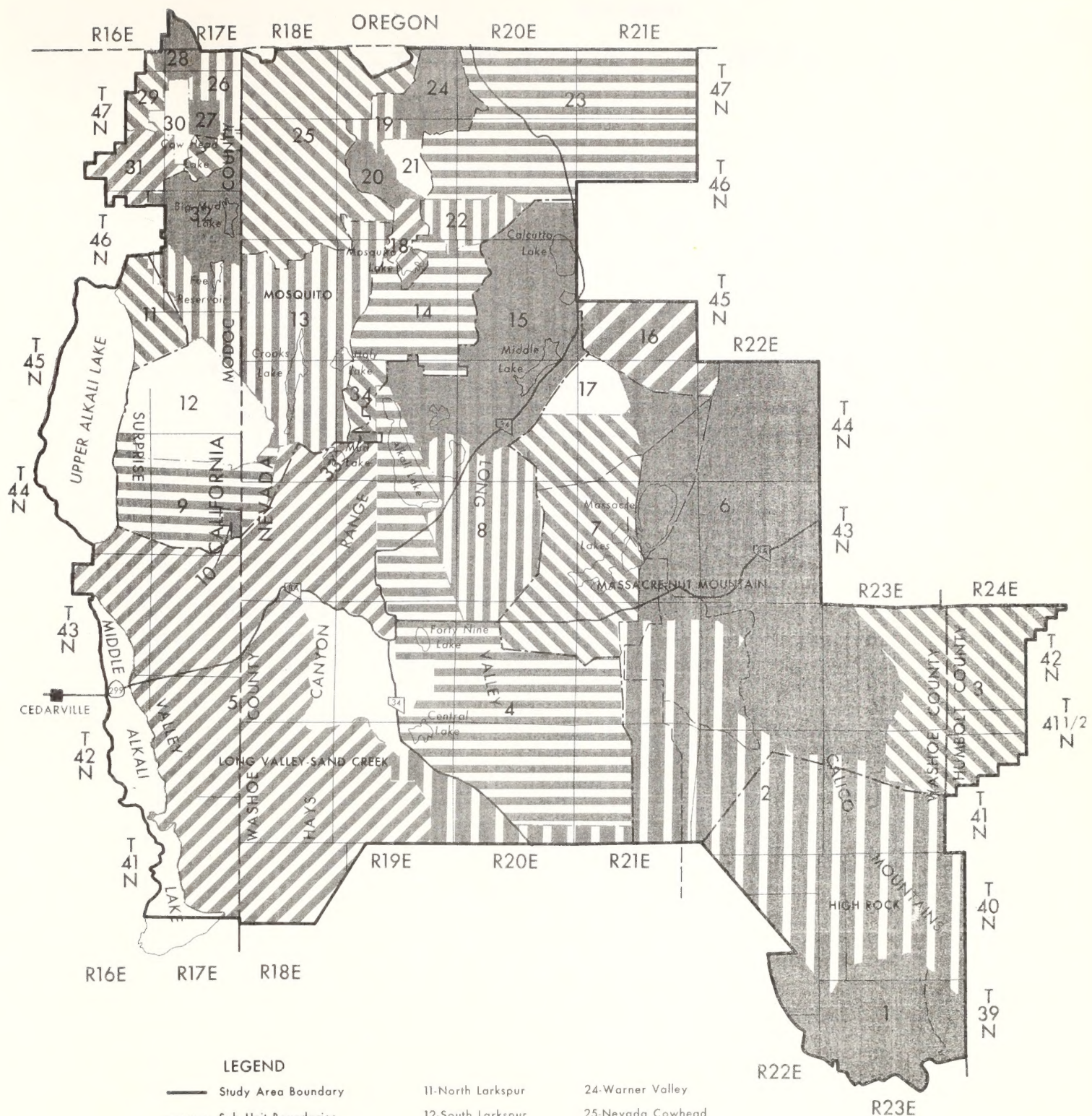


TABLE 2-8

LIVESTOCK USE - SUB-UNIT 1, HIGH ROCK

<u>Operator</u>	<u>AUM / Percent</u> <u>1/</u>
Bunyard	1,526 / 47
Earp	3,484 / 42

1/ Percentage use is of operator's total BLM use in the study area.
For example: Within the environmental statement area Bunyard
uses 3,246 AUMs of forage on public land. Forty-seven percent
(1,526) of that forage is located in Subunit 1.

TABLE 2-9
EXISTING AND PROPOSED GRAZING MANAGEMENT SUMMARY

Sub-Unit	Allotment	Kind of Livestock	Stocking Rate (AUMs)		Season of Use		Grazing Formula		Degree of Utilization	
			Present	Proposed	Present	Proposed	Present	Proposed	Present	Proposed
1	Little High Rock Massacre Mountain TOTAL SUB-UNIT 1	C C/S	1,545 3,455 5,000	0 0 0	04/16-09/30 C 04/01-10/15 S 04/01-12/07	- - -	CG CG CG	None None None	45% ^{1/} 40% ^{1/} 0	0 0 0
2 A	Board Corral	C	1,445	0/957 ^{1/}	04/16-10/15	06/01-09/30	CG	Graze 1 of every 3 years.	58% ^{1/}	30%
2 B	Sagehen	C	572	0	04/16-10/15	-	CG	Prescribed Grazing.	46% ^{1/}	Variable
	Massacre Lake	C	400	0	04/15-10/06	-	5PRR	Prescribed Grazing.	69% ^{1/}	Variable
	Nut Mountain	C	200	0	04/15-10/15	-	CG	Prescribed Grazing.	46% ^{1/}	Variable
2 C	Massacre Lake	C	2,242	975	04/15-10/15	05/15-09/30	5PRR	4PRR	69% ^{1/}	50%
2 D	Nut Mountain	C	400	0	04/15-10/15	-	CG	None	46% ^{1/}	0
2 E	Nut Mountain	C	5,995	2,502	04/15-10/15	06/15-09/30	CG	4PRR	46% ^{1/}	30%
	Massacre Mountain	C/S	4,872	2,339	C 04/01-10/15 S 04/01-12/07	06/15-09/30 06/15-09/30	CG	4PRR	40% ^{1/}	30%
	Wall Canyon	C	3,215	1,260	04/16-10/15	06/15-09/30	CG	4PRR	49% ^{1/}	30%
	TOTAL SUB-UNIT 2		19,341	7,076/8,033						
3 A	Sand Creek	C	5,821	5,410	04/16-10/15	Seeding: 04/15-10/30 Native: 05/15-09/30	CG	4PRR & Seedings	60% ^{1/}	50%
3 B	Calcutta	C	2,611	3,524	04/16-10/15	Seeding: 04/15-08/15 Native: 08/15-12/31	CG	Fall/Winter Use and Seedings	60%	50%
	Little Basin	C	1,857	2,525	04/16-08/31	Seeding: 04/15-08/15 Native: 08/15-11/30	CG	Fall/Winter Use and Seedings	59%	50%
	Long Valley	C	2,664	3,288	05/01-09/30	Seeding: 04/15-08/15 Native: 08/15-12/31	CG	Fall/Winter Use and Seedings	68%	50%

1/ 795 AUMs are grazed once every 3 years.

TABLE 2-9 (Continued)
EXISTING AND PROPOSED GRAZING MANAGEMENT SUMMARY

Sub-Unit	Allotment	Kind of Livestock	Stocking Rate (AUMs)		Season of Use		Grazing Formula		Degree of Utilization	
			Present	Proposed	Present	Proposed	Present	Proposed	Present	Proposed
4 A	Massacre Mountain	C/S	665	881	C 04/01-10/15 S 04/01-12/07	Seeding: 04/15-08/15 Native: 08/15-12/31	CG	Fall/Winter Use and Seedings	75%	50%
	North Larkspur	C	150	204	10/01-11/30	Seeding: 04/15-08/15 Native: 08/15-12/31	CG	Fall/Winter Use and Seedings	75%	50%
	TOTAL SUB-UNIT 3		13,768	16,286						
	Upper Sand Creek	C	42	42	04/16-10/15	05/15-09/30	CG	Custodial Mgt.	50%	50%
	Alkali Lake	C	0	0		05/15-09/30	CG	Custodial Mgt.	50%	50%
	Gravelly	C	270	270	06/01-10/31	05/15-09/30	CG	Custodial Mgt.	50%	50%
	Bally Mtn. #1	C	48	48	06/01-10/31	05/15-09/30	CG	Custodial Mgt.	50%	50%
	Bally Mtn. #2	C	150	150	06/01-10/31	05/15-09/30	CG	Custodial Mgt.	50%	50%
	Bally Mtn. #3	C	34	34	06/01-06/30	05/15-09/30	CG	Custodial Mgt.	50%	50%
	Warner Valley	C	320	320	06/15-09/15	05/15-09/30	CG	Custodial Mgt.	50%	50%
4 B	12 Mile	C	192	192	05/01-10/31	05/15-09/30	CG	Custodial Mgt.	50%	50%
	Lartirigoyen	S	364	364	07/08-09/30	05/15-09/30	CG	Custodial Mgt.	50%	50%
	North Cowhead	C	453	453	04/16-06/30	05/15-09/30	CG	Custodial Mgt.	56%	50%
	Scammon	C	57	57	05/01-09/30	05/15-09/30	CG	Custodial Mgt.	50%	50%
	Nine Mile	C	30	30	06/01-06/30	05/15-09/30	CG	Custodial Mgt.	50%	50%
	West	C	161	161	05/01-06/15	05/15-09/30	CG	Custodial Mgt.	50%	50%
	East	C	510	599	04/16-08/31	05/15-09/30	CG	Custodial Mgt.	35%	50%
	Boggs Reservoir	C	1,483	859	04/16-10/15	05/15-09/30	CG	3PRR	34%	50%
	Crooks Lake	C/H	3,088	2,807	C 04/01-10/30 H 04/24-05/16	05/15-09/30	10PDR	3PRR	69% 44% ^{1/}	50%
	South Larkspur	C	1,040	874	04/01-09/15	05/15-09/30	CG	3PRR	50%	50%
4 C	Nevada Cowhead	C	2,880	3,086	04/16-09/30	05/15-09/30	CG	4PRR	28% ^{1/}	50%
	Nevada Coleman	C	4,477	3,357	04/16-11/30	05/15-09/30	CG	4PRR	40%	50%
	Little Valley	C	640	447	05/01-09/15	05/15-09/30	CG	4PRR	43%	50%
	Mosquito	C	2,011	1,267	04/01-10/31	05/15-09/30	CG	4PRR	45%	50%
	Holy	C	371	234	05/01-07/31	05/15-09/30	CG	4PRR	50%	50%
	TOTAL SUB-UNIT 4		18,621	15,651						
	STUDY AREA TOTAL		56,730	39,013/39,970						

LEGEND: CG - Continuous Grazing; 4PRR - 4 Pasture Rest Rotation; 3PRR - 3 Pasture Rest Rotation; 10PDR - 10 Pasture Deferred Rotation.

1/ Utilization includes use by horses

TABLE 2-10

LIVESTOCK USE - SUB-UNIT 2, MASSACRE MOUNTAIN/NUT MOUNTAIN

(AUM / %) ^{1/}

Operator	Area 2A	Area 2B	Area 2C	Area 2D	Area 2E	Total Sub-Unit
Bunyard					645 / 20	645 / 20
Coops		52 / 3		104 / 6	1,546 / 91	1,702 / 100
Earp					4,227 / 51	4,227 / 51
Erquiaga	722 / 100					722 / 100
Hereford					820 / 75	820 / 75
Hussa					1,838 / 100	1,838 / 100
Marx		240 / 15	1,348 / 85			1,588 / 100
Parmen, J.	723 / 53					723 / 53
Weber		880 / 12	894 / 13	296 / 4	5,006 / 71	7,076 / 100
TOTAL ^{2/}	1,445 / 2	1,172 / 2	2,242 / 4	400 / 1	14,082 / 25	19,341 / 34

^{1/} Percentage use is of operator's total BIM use in the study area.

^{2/} AUMs in management area as percentage of entire planning unit.

The Bunyard operation utilizes this area for sheep during spring and fall. The tablelands adjacent to High Rock Canyon are especially important since they are used to lamb during April. After lambing the sheep are trailed across the study area to BLM and Forest Service allotments for summer use. Sheep are trailed back to the High Rock Sub-Unit during October, where they remain until December. They are then trailed into BLM's Winnemucca District for the winter. In addition to this sheep use, Bunyard runs cattle season-long on the Massacre Mountain Allotment portion of the sub-unit.

Earp, whose base ranch is about five miles to the southeast, also uses the sub-unit and trails cattle to the area for season-long use.

Sub-Unit 2, Massacre Mountain/Nut Mountain

Nine livestock operators graze cattle on six allotments in this area (TABLES 2-10 and 2-9).

Management Area 2A: This area is composed entirely of the Board Corral Allotment and is grazed by E. Hill and J. Parman for season-long cattle use.

Management Area 2B: This area is composed of the Sagehen and portions of the Massacre Lakes and Nut Mountain Allotments. The Massacre Lake portion, presently included in the Massacre Lake Allotment Management Plan, is periodically grazed during the spring in favorable years. The rocky, arid nature of this area limits livestock use during the hot summer months. The Sagehen Allotment and that portion of the Nut Mountain Allotment lying within this area have similar physiographic and vegetative characteristics. Livestock use is normally limited to spring or early summer use except during years with above-normal precipitation.

Management Area 2C: This area is composed of that portion of the Massacre Lake Allotment not located within Management Area 2B. This allotment has been grazed under a rest-rotation grazing system for nine years. Because of fluctuating weather conditions, a set grazing formula has not been followed. All pastures, however, have been periodically rested. Approximately 5,000 acres in the southern portion of this allotment have been sprayed or plowed and seeded.

Management Area 2D: This area is composed of a small portion of the Nut Mountain Allotment. It is normally grazed season-long.

Management Area 2E: The Wall Canyon Allotment and portions of the Nut Mountain and Massacre Mountain Allotments comprise this management area. The Nut Mountain and Massacre Mountain Allotments are normally grazed season-long. The Wall Canyon Allotment is grazed primarily during the spring. On June 15 Weber, Heryford, and Hussa move the majority of their livestock to the Sheldon Antelope Refuge for summer grazing.

Sub-Unit 3, Long Valley/Sand Creek

Eighteen livestock operators graze cattle on six allotments in the Long Valley-Sand Creek Sub-Unit (TABLES 2-11 and 2-9).

Management Area 3A: This area is composed of the Sand Creek Allotment, which is grazed season-long by 10 livestock operators.

Management Area 3B: This area includes the Long Valley, Little Basin, Calcutta, and North Larkspur Allotments and a small portion of the Massacre Mountain Allotment. The North Larkspur Allotment is presently grazed during the fall and early winter by cattle from the Peterson operation. The remaining allotments are normally grazed season-long.

Sub-Unit 4, Mosquito

Currently 15 livestock operators graze sheep and cattle on the 22 allotments comprising the Mosquito Sub-Unit (TABLES 2-12 and 2-9).

Management Area 4A: This area is composed of 13 small allotments which contain high percentages of intermingled private land. The present use of allotments within this area is variable.

The Upper Sand Creek Allotment is used by the Bunyard operation during the fall. Cattle are gathered from the Boggs Allotment and held here for a short time prior to moving them to the base ranch for the winter. The Gravelly and the Bally Mountain 1, 2, and 3 Allotments are generally used during the late summer and fall. Cattle are allowed to drift from the Nevada Cowhead Allotment onto these allotments as vegetation begins to mature and dry up on the lower-elevation ranges.

Bunyard's sheep graze in the Lartirigoyen Allotment and the adjacent Forest Service allotments during the summer. The Fee operation grazes cattle on the Twelve Mile Allotment June 15 to November 30. A portion of the cattle are moved to Forest Service lands for summer use. The North Cowhead, Nine Mile, and West Allotments are used during the spring and early summer. Cattle are then moved to private or Forest Service lands for summer use. The Alkali Lake and Nine Mile Allotments are grazed in conjunction with private lands during the spring and summer.

Management Area 4B: Crooks Lake, South Larkspur, Boggs, and East Allotments make up this area. The Crooks Lake Allotment is currently under an allotment management plan and has been grazed under a deferred-rotation grazing system since 1969. The allotment is used from April until mid-July, when the cattle are moved onto private meadows. Cattle again graze the allotment in November. The Boggs and the South Larkspur Allotments are grazed season-long. The East Allotment is grazed from mid-April until the end of June. Cattle are moved onto Forest Service Allotments for the remainder of the grazing season.

TABLE 2-11

LIVESTOCK USE - SUB-UNIT 3, LONG VALLEY/SAND CREEK

(AUMs / %)^{1/}

Operator	Area 3A	Area 3B	Total Sub-Unit
Berryessa	2,178/100		2,178/100
Bunyard		93/ 3	93/ 3
Cal-Vada Ranches		111/ 4	111/ 4
Earp		572/ 7	572/ 7
Hapgood		496/100	496/100
Heryford	280/ 25		280/ 25
Hill, N.		2,004/100	2,004/100
Jones	128/ 33	264/ 67	392/100
Kirkpatrick	226/ 9	2,207/ 91	2,433/100
Laxague	854/ 77	250/ 23	1,104/100
Page	138/ 39	214/ 61	352/100
Parman, J.	641/ 47		641/ 47
Parman, R.	128/100		128/100
Peterson		150/ 41	150/ 41
Quirk		560/100	560/100
Smith		166/100	166/100
Steward	392/ 70	168/ 30	560/100
Warrens Ranch	<u>856/ 55</u>	<u>692/ 45</u>	<u>1,548/100</u>
TOTAL	5,821/ 10	7,947/ 14	13,768/ 24

^{1/} Percentage use is of operator's total BLM use in the study area.

TABLE 2-12

LIVESTOCK USE - SUB-UNIT 4, MOSQUITO

(AUMs / %)^{1/}

Operator	Area A	Area B	Area C	Total Sub-Unit
Bordwell		1,040/100		1,040/100
Bunyard	406/ 12	588/ 18		994/ 23
L & L Cattle Co.			3,022/ 96	3,022/ 96
Carey, F. & J.		121/100		121/100
Carey, P. & J.		154/100		154/100
Cockrell's Inc.		177/100		177/100
Fee	283/ 8	3,088/ 92		3,371/100
Harris		895/100		895/100
Kyte			1,111/100	1,111/100
Peterson	161/ 44	58/ 16		219/ 60
Schadler, G. & H.	57/100			57/100
Schadler Ranches, Inc.	1214/ 19		5,101/ 81	6,315/100
Wolfens Feed Lots			<u>1,145/100</u>	<u>1,145/100</u>
TOTAL	2,121/ 4	6,121/ 11	10,379/ 18	18,621/ 33

^{1/} Percentage use is of operator's total BLM use in the study area.

Management Area 4C: Four of the five allotments which make up this area, Mosquito, Nevada Coleman, Nevada Cowhead, and Little Valley, are grazed season-long. The fifth, the Holy Allotment, is grazed in conjunction with the Cal-Vada Ranch private lands and is periodically deferred or rested.

Wildlife

Terrestrial Habitat

Terrestrial habitat is characterized by broad expanses of sagebrush/grasslands broken by occasional key wildlife habitat types such as Idaho fescue/ bitterbrush, bluegrass sedge, mountain mahogany, Baltic rush, aspen, rimrock, and riparian associations. The Idaho fescue/bitterbrush habitat type comprises 12 percent of the total area; the others constitute less than 1 percent. Although only a small portion of the area, these habitats support the greatest density and diversity of wildlife.

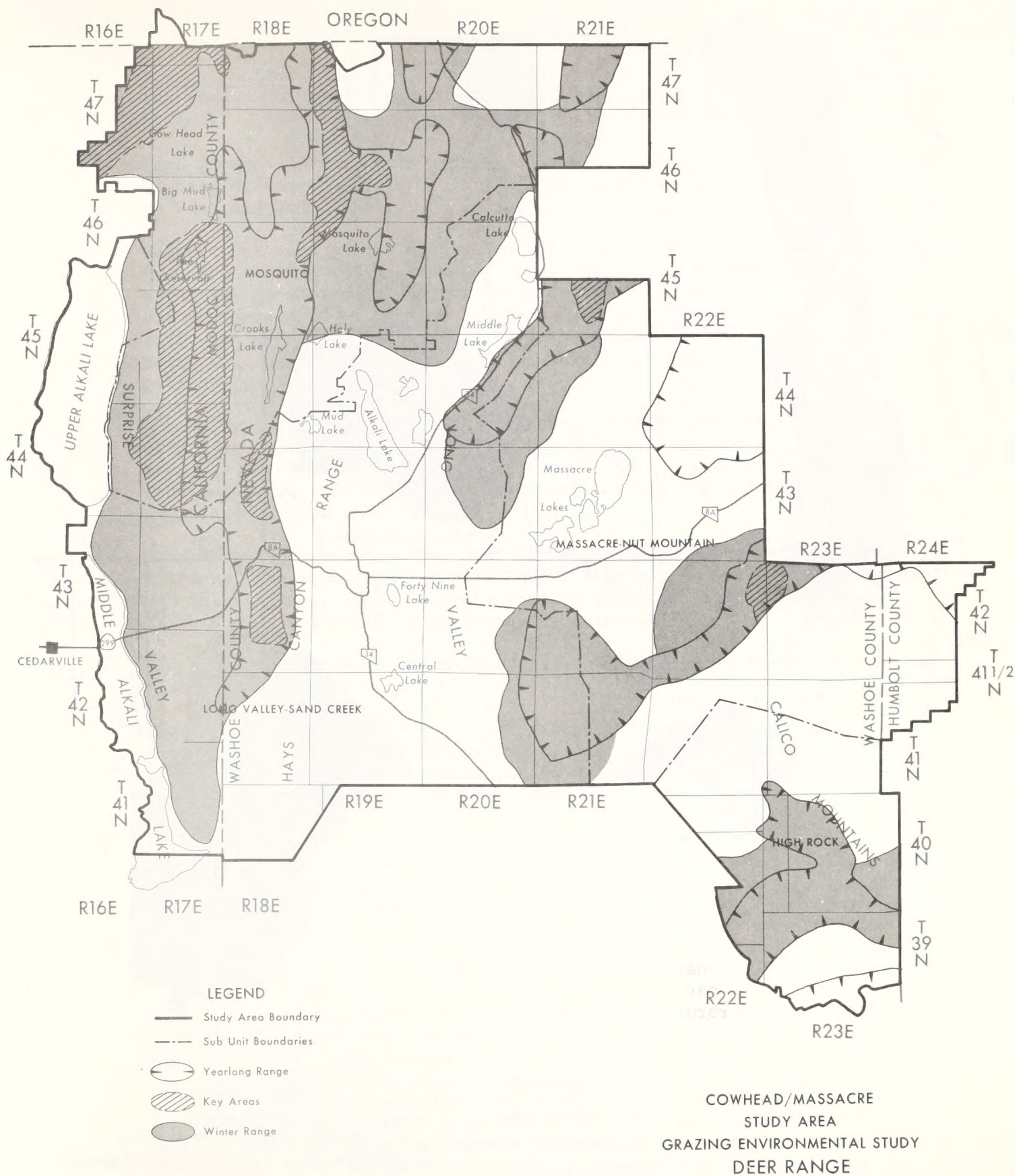
Game Species:

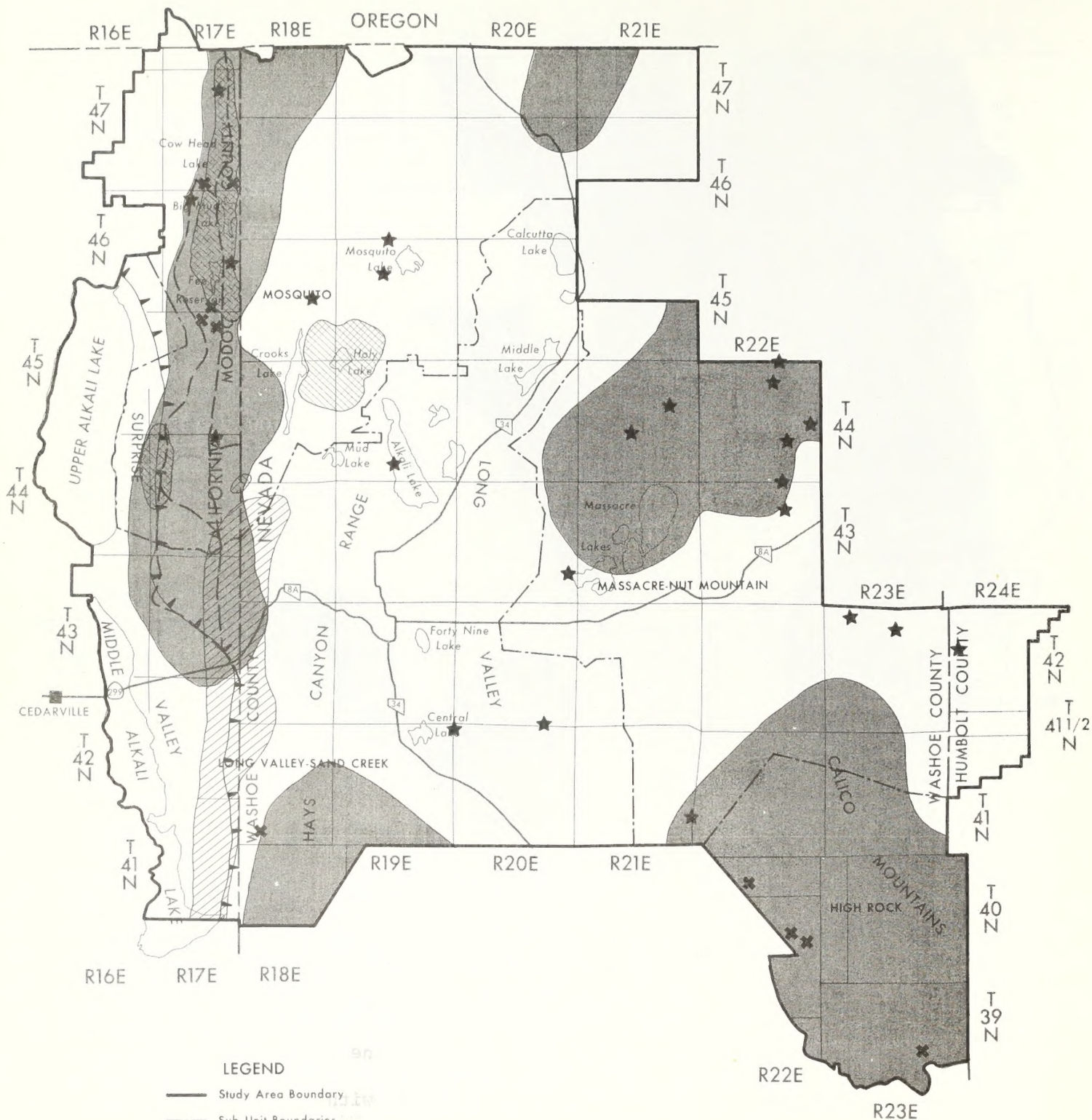
Mule Deer: Mule deer are the most numerous big-game animals. Although the population fluctuates seasonally, about 1,800 deer inhabit the area. Their total distribution is shown on MAP 2-3. Almost 90 percent of all deer observed in Cowhead/Massacre were found in mountain brushfields and aspen habitat. Condition of these habitats is poor. Sites distant from water and subject to little livestock use are frequently in satisfactory condition. Four aspen stands sampled were in poor condition with only 8 percent of climax vegetation present. Understory vegetation important for deer fawning cover is largely absent in aspen stands.

Antelope: Antelope populations in both Nevada and California have increased during the past 20 years by up to 300 percent. Cowhead/Massacre populations have increased, but less dramatically. About 1,200 antelope inhabit the area. Their distribution is shown on MAP 2-4. The low sagebrush associations and dry lakebeds are prime antelope habitat. Key concentration areas exist near Holy Lake, the region near the Sheldon Antelope Refuge complex, Surprise Valley, and High Rock.

Three major factors are adversely affecting antelope: a lack of forbs in spring and summer; competition for bitterbrush with livestock and deer and predation on newborn fawns. Early spring livestock grazing and annual precipitation patterns greatly affect forb availability; over-utilization of bitterbrush adversely affects antelope.

Bighorn Sheep: About 140 square miles of potential bighorn sheep habitat exists in three areas in Cowhead/ Massacre. Although no bighorn presently inhabit the area, an estimated 500 animals could be supported. High Rock Canyon is a high priority reestablishment area. However, competition with livestock, especially sheep because of potential disease interaction, reduces the probability of successful reestablishment. Bighorn are adapted to climax vegetation conditions, which do not exist at present.





**COWHEAD/MASSACRE
STUDY AREA
GRAZING ENVIRONMENTAL STUDY
ANTELOPE AND SAGE GROUSE RANGE**

Mountain Lions: Two to four resident adult lions are thought to inhabit the area. The area's topographic character limits the quality of habitat. Transient lions cross portions of Cowhead/Massacre.

Sage Grouse: About 10,000 sage grouse are distributed throughout Cowhead/Massacre, except in Surprise and Long Valleys (Nevada Department of Fish and Game, 1978).

Habitat for sage grouse consists of four important components: strutting grounds; nesting areas; brooding areas; and wintering areas. Known strutting grounds and brooding areas are shown on MAP 2-4. Strutting grounds appear to be the hub of year-round activity (Eng and Schladweiler, 1972; and Wallestad and Pyrah, 1974) as well as the focus of breeding activity. Open areas of low-growing vegetation provide strutting habitat.

Generally, about 80 percent of all nests occur within two miles of strutting grounds (Gill, 1965; Martin, 1970). About one-third of the area possesses suitable nesting habitat. The low sagebrush association provides about 180,000 acres of such habitat and the big sagebrush association about 150,000 acres.

Good brooding habitat occurs over 41 percent (410,000 acres) of Cowhead/Massacre. Meadows, which sustain heavy sage grouse use in late summer and fall (Savage, 1969; Oakleaf, 1971), constitute less than 1 percent of this area and suffer from severe overgrazing.

About 350,000 acres of suitable wintering habitat are present in Cowhead/Massacre.

Sage grouse numbers have declined but the extent is undocumented. Habitat degradation is considered the major cause by the Nevada Department of Wildlife, while some ranchers and conservation groups contend over-hunting has been a major factor in their decline.

Chukar: There are an estimated 1,750 chukar in Cowhead/Massacre. The greatest population densities occur in the High Rock Canyon region, with other scattered populations found in talus areas and where scattered rocks, shrubs, and grasses supply food and cover needs. During summer, water is considered a limiting factor. Chukar use snow and succulent vegetation to satisfy water needs during much of the year. Little definitive analysis of chukar habitat has been done in Cowhead/Massacre.

Quail: California quail are found most commonly within about 300 yards of water where dense shrubs provide escape cover (Edminster, 1954). Riparian areas constitute prime quail habitat. Populations of quail in the study area are scattered and numbers are low because such habitat is lacking. Livestock concentrate in areas near water and, through their feeding and rubbing habits, destroy young trees and shrubs that would provide cover and roosting areas. Elimination or severe reduction of willows and other shrubs near perennial water sources eliminates most preferred habitat. Less than 2 percent of the area is potential prime habitat.

Mourning Dove: Dove inhabit the entire area from April until early September. Habitat is in good condition and dove production is high. The birds nest in shrubs, trees, and on the ground. Dove prefer open areas of sparse vegetation which provide the open aspect they prefer and feeding areas where seeds are found. Water is also a key habitat component.

Furbearers: Nine species of furbearers occur in Cowhead/Massacre: raccoon; beaver; bobcat; coyote; long-tailed and short-tailed weasel; badger; and striped and spotted skunk. All are found in low-medium densities (Nevada Department of Fish and Game, 1978).

Waterfowl: Waterfowl use is limited because suitable habitat is limited. Periodic flooding in spring and fall provides temporary habitat near shallow lakes. New Years Lake is the only major area providing nesting habitat. Nevada Department of Wildlife aerial surveys indicate that an average of eight pairs of Canada geese and 18 pairs of ducks nest on the area. Over 150 Canada geese molt on New Years Lake each year and about 60 molt on Massacre Lake.

The quality of waterfowl habitat is reduced by grazing near lakeshores. Continuous grazing use reduces residual vegetation by 80-90 percent. Mundinger (1976) demonstrated an inverse relationship between the attractiveness of an area to waterfowl and the amount of forage removed by livestock.

Waterfowl make occasional use of ponds and streams in the area.

Nongame Species: Twenty-four species of raptors occur in the area. Thirteen species breed there, including the sharp-shinned hawk, goshawk, marsh hawk, red-tailed hawk, golden eagle, prairie falcon, American kestrel, turkey vultures, great horned owls, long- and short-eared owls, screech owls, and burrowing owls.

Thirty-nine pairs of golden eagles and their respective nests have been identified. There is an average of one pair per 50 square miles. However, where suitable rimrock exists, a pair is found every 4-6 miles. High Rock and Little High Rock have particularly high nesting densities (10 pairs). In 1977, 81 percent of the eagle pairs were active with an average of 1.86 young present per pair. Analysis of food remains from local nests indicates 86 percent of the prey consumed by golden eagles was rabbit.

Twenty-nine prairie falcon pairs have been identified in the area, eight of which nest in the High Rock region. Brood size ranges from 2-5 and averaged 3.0 in 1977.

Twenty-seven pairs of red-tailed hawks and their nests have been found in Cowhead/Massacre. One-fourth of the nests were on cliffs, the rest were found in trees. Brood size averages 3.0 per nest. High concentrations are found in the High Rock region.

No marsh hawk nests have been found but adult birds were observed on private land in Surprise Valley.

American kestrels are abundant in the area. Although the extent of their nesting is unknown, 150 nesting pairs are estimated in Cowhead/Massacre. Five pairs are known to nest in High Rock. Preferred nesting sites are juniper stands composed of numerous old trees.

Two pairs of turkey vultures are known to nest in the area. One of the two nests produced two young in 1977.

Five great horned owl nests, three burrowing owl nests, one long-eared owl nest, and one screech owl nest have been discovered, although intensive owl nesting surveys have not been conducted.

The small mammals and nongame birds associated with specific habitat types are shown in APPENDIX D. It should be noted that this is a partial list indicating only the species observed in the study. Several other species use many of the habitat types. This appendix also provides a comparison of habitat structural characteristics and nongame wildlife present in grazed and ungrazed habitat.

Each habitat type has been changed significantly by livestock grazing. Grazing alters the structural arrangement of cover and forage and, as habitat structure changes, so do nongame species composition and abundance. A notable effect of grazing has been the reduction in the diversity of small mammals and birds on the more mesic sites.

Aquatic Habitat

High Rock Canyon: Streams in the canyon have low flows (2 cfs) or interrupted flows, thus providing intermittent aquatic habitat. Water temperatures reach as high as 78 degrees Fahrenheit; little stream shading occurs. Banks are unstable and heavy livestock concentrations cause the banks to collapse. Waters are shallow and heavily laden with aquatic growth. Dace are the only fish known to live in these streams.

Sand Creek (Long Valley/Sand Creek): Sand Creek is 16 miles long, 5.5 miles of which are on public land. The average rate of flow is 4-5 cfs; the stream averages eight feet wide and 3-17 inches deep. Pool to riffle ratio is 5/95. About 15 percent of the stream is shaded. The bottom is heavily silted since stream banks are bare and unstable, frequently caving in and sloughing due to cattle trampling and overgrazing. Waters are shallow and heavily laden with aquatic growth. Aquatic plants present include watercress, rushes, sedges, algae, and moss. Speckled dace are common, and no other fish were found during sampling. Width of the riparian zone is 10-75 yards. Willow, rose, sage, juniper, and serviceberry are present but are heavily grazed.

Twelve Mile Creek (Mosquito): One and one-half miles of this creek are on public land. The stream averages 21 feet wide and 8.5 inches deep (maximum depth 36 inches). Flow is 10 cfs, pool/riffle ratio is 40/60, and less than 40 percent of the stream is shaded. Streambank condition is poor. Heavy livestock use has removed excessive amounts of vegetation, baring 25 percent of the soil along the bank and promoting active erosion. Streambank damage is severe with 40 percent of the streambank showing erosion and sloughing. No evidence of bank recovery is visible.

The riparian zone is 40 yards wide and willows, pines, juniper, rushes, rumex, and tules are present, although willows and other palatable species are heavily grazed.

Coleman Creek (Mosquito): Coleman Creek is six miles long, half is under public ownership. Stream width averages five feet, depth averages three inches, and rate of flow averaged 4 cfs in September 1977. Pool to riffle ratio is 0/100, and 25 percent of the stream is shaded. Duckweed is common, indicating low dissolved oxygen levels. Macro-invertebrate sampling found caddisflies, mayflies, stoneflies, water striders, dragonflies, snails, clams, and scuds. Water temperature averages 78 degrees Fahrenheit. No fish were found in the stream.

Streambank condition is poor as a result of heavy livestock trampling and overgrazing. The riparian zone is 11 yards wide and includes willows, serviceberry, snowberry, and currant.

Summary Comparison of Wildlife Values

In order to evaluate overall wildlife values in each management area, the wildlife resource was divided into nine categories, for example, deer winter range, raptors, aquatic habitat, etc. For each category, the percentage of the total resource in the planning unit was determined for each management area. The results, summarized in TABLE 2-13, permit a comparison of the relative importance of each management area regarding wildlife, which can be summarized as follows:

Extremely High	Sub-Unit 1
High	Management Areas 2E, 3A, 4B
Moderate	Management Areas 4A, 4C
Low	Management Areas 2A, 2B, 2C, 2D, 3B

APPENDIX E details the methodology used. No attempt was made to place a value judgment on the relative importance of each category.

TABLE 2-13
Estimated Wildlife Values by Management Area

Wildlife Values	Management Areas										
	1	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C
Deer Summer Range	.055	.055	.055	.055	.027	.178	.088	.022	.055	.329	.082
Deer Winter Range	.046	.046	.046	.046	.000	.173	.231	.018	.277	.016	.069
Antelope Summer Range	.103	.041	.041	.041	.041	.248	.099	.033	.021	.124	.207
Antelope Winter Range	.377	.042	.042	.042	.042	.126	.109	.034	.037	.050	.105
Potential Bighorn Habitat	.950	.000	.000	.000	.000	.000	.030	.000	.000	.010	.010
Sage Grouse Critical Areas	.210	.000	.091	.055	.000	.345	.055	.000	.145	.109	.000
Chukar Habitat	.343	.029	.029	.043	.000	.086	.200	.086	.043	.057	.086
Raptors - Nesting Pairs	.404	.010	.010	.020	.000	.131	.152	.000	.020	.061	.182
Nongame Habitat	.200	.018	.006	.048	.009	.216	.050	.050	.080	.120	.200
Aquatic Habitat	.180	.004	.002	.010	.002	.042	.320	.000	.280	.025	.025
Waterfowl Habitat	.000	.000	.000	.240	.000	.000	.160	.000	.000	.600	.000
TOTAL	2.858	0.245	0.322	0.600	0.121	1.545	1.493	0.243	0.958	1.501	0.966

NOTE: See appendix E for explanation of determination of wildlife values.

Threatened or Endangered Animal Species

Informal consultation with the U. S. Fish and Wildlife Service confirmed that no endangered species are known to be dependent on the study area.

The southern bald eagle, on both the U.S. Fish and Wildlife Service and States of California and Nevada lists of endangered species, has been observed in Surprise Valley although no nesting observations have been documented on the study area (Mallett, personal communication, 1976).

Wild Horses and Burros

Two burros and 705 wild and free roaming horses are known to inhabit the study area. They occur in three herd management areas covering all or portions of each sub-unit (TABLE 2-14 and MAP 2-5).

The wild horse and burro populations appear healthy. Aerial inventories indicate an annual population increase of 17-21 percent.

Sub-Unit 1, High Rock

Two hundred seventy-nine (279) horses and two burros occur within this sub-unit. Most wild horse and burro use is on the low sagebrush/Sandberg bluegrass site with lesser amounts of use on the low sagebrush/bluebunch wheatgrass site.

During hot summer months, horses concentrate on the bluegrass-sedge association along the High Rock Complex canyon bottoms which contain green forage and water.

Sub-Unit 2, Massacre Mountain/Nut Mountain

This sub-unit presently supports 421 wild horses: 50 are located in Management Area 2A; 48 in Management Area 2B; 58 in Management Area 2C; and 265 in Management Area 2E. Greatest use occurs within the low sagebrush/Sandberg bluegrass, the low sagebrush/ bluebunch wheatgrass and the big sagebrush/ bluebunch wheatgrass sites. During the hot summer months, they concentrate on the bluegrass/ sedge association for green forage and water.

Existing allotment fences between Management Areas 2A and 2B restrict home ranges and impede seasonal wild horse movement. Horses within these areas migrate to lower elevational ranges during periods of heavy snow.

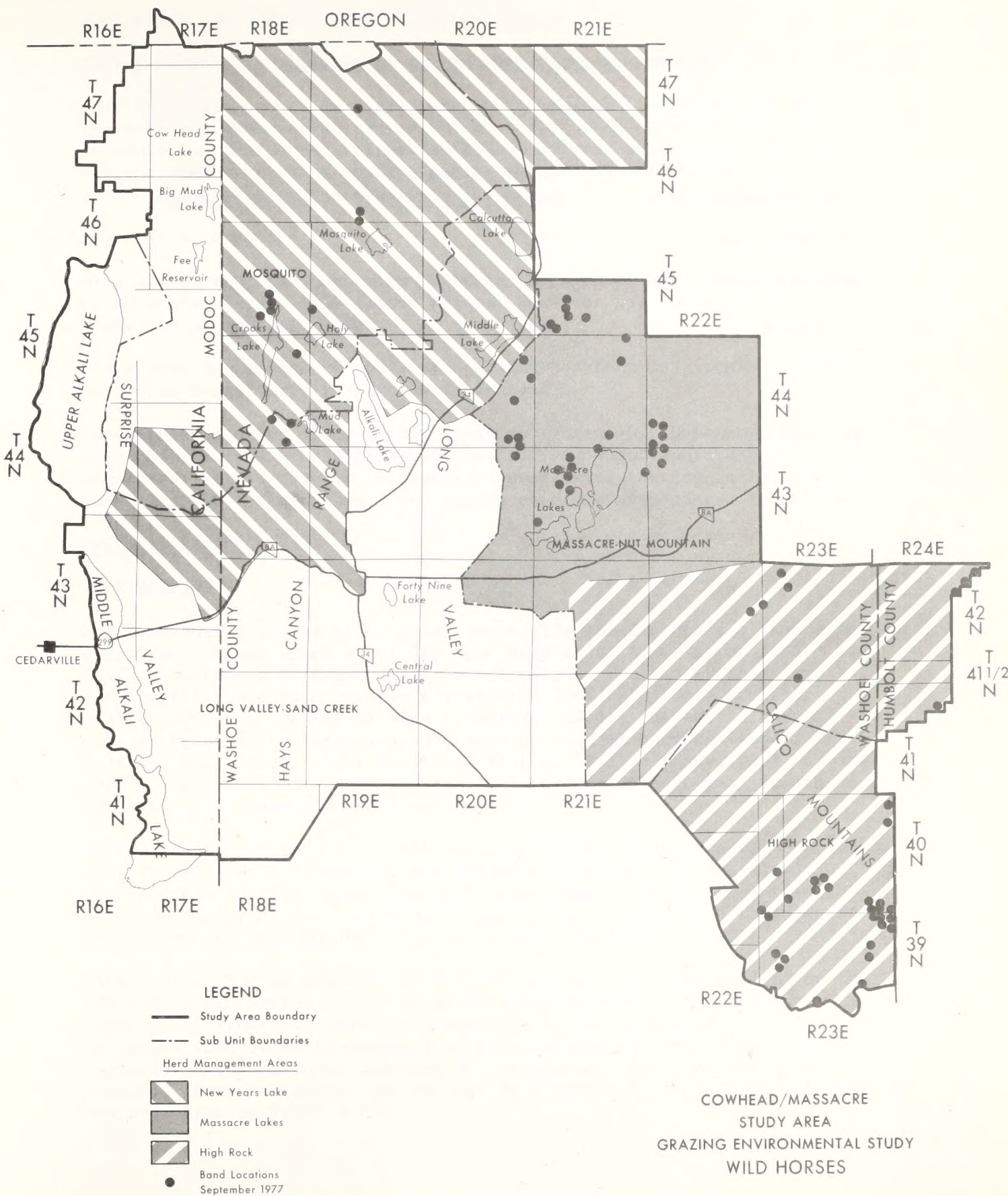


TABLE 2-14

WILD HORSES AND BURROS IN THE STUDY AREA

<u>Herd Management Area</u>	<u>Number of Animals</u>		<u>Number of Bands</u>
	<u>Horses</u>	<u>Burros</u>	
New Years Lake	60	0	12
Massacre Lake	270	0	33
High Rock	<u>375</u>	<u>2</u>	<u>38</u>
TOTAL	705 ^{1/}	2	83

1/ Including 152 colts.

Sub-Unit 3, Long Valley/Sand Creek

Thirty-eight (38) wild horses are located within Management Area A.

Most horse use occurs on low sagebrush/ bluebunch wheatgrass and the bitterbrush/Idaho fescue sites. Horses often seek shelter within the intermingled juniper-low sagebrush/bluebunch wheatgrass site. Use is concentrated near water sources during the hot summer months. Heavy use occurs on the bluegrass-sedge associations.

Sub-Unit 4, Mosquito

Nine horses are found on Bally Mountain (Management Area 4A). Most use is on bitterbrush/ Idaho fescue sites. Heaviest use occurs on the bluegrass-sedge association.

Since over 50 percent of the area on Bally Mountain is privately owned, much wild horse activity is on private land.

Twenty-three horses occur within Management Area 4B. Most use is on low sagebrush/bluebunch wheatgrass and juniper/low sagebrush/bluebunch wheatgrass sites. Use is concentrated near water sources during the hot summer months. Again, heavy use occurs on bluegrass-sedge associations.

Cultural Resources

Archaeology

Until recently, in the study area, seasonally nomadic bands of hunter/gatherers exploited a broad spectrum of dry land plants and animals for food. The land-use patterns of these bands (consisting of frequently shifting settlements based on a broadly diversified food base) were probably stable over long periods of time (Jennings, 1964), subject to changes only in response to variations in local ecological factors (especially climate; see Antevs, 1948; Davis and Elston, 1972; O'Connell and Hayward, 1972). This extensive land use resulted in an archaeological record of extraordinary abundance and diversity.

Survey of 3.5 percent of the public lands in the study area (1.8 percent in a probabilistic framework; see APPENDIX F and MAP 2-6) resulted in the recording of 557 archaeological sites, indicating an area-wide average density of 13.1 sites per square mile. It allows a raw figure prediction of about 20,300 sites throughout the entire area.

Site Types: Eleven provisional site categories have been defined on the basis of their spatial patterning and their artifact types. These definitions ignore chronology, however; over the course of several millennia (and often in response to fluctuations in local environmental conditions) the cultural function of individual site types may have changed. Site categories are defined in APPENDIX F. Sub-unit distributions are presented in TABLE 2-15.

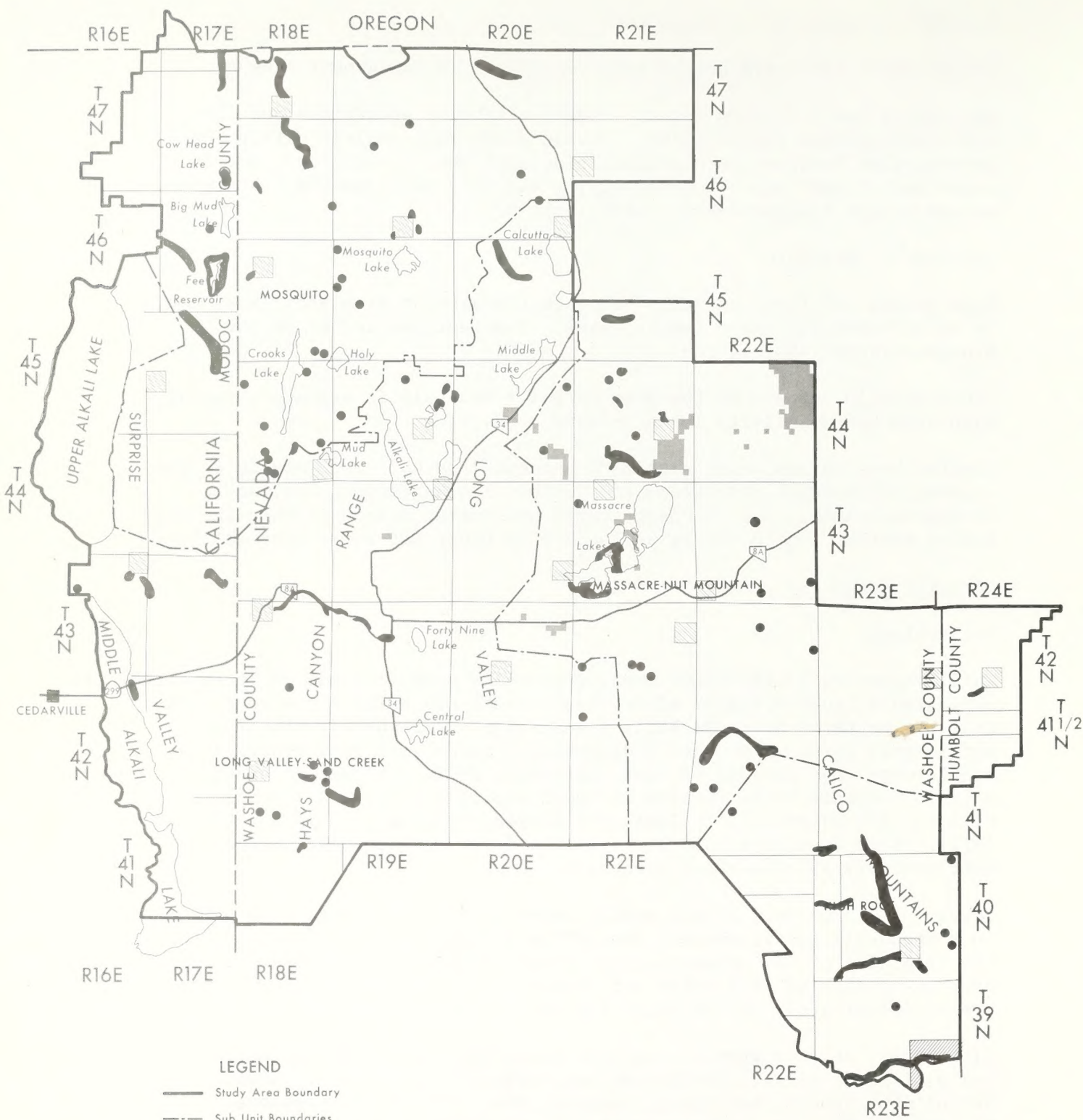


TABLE 2-15

DISTRIBUTION OF KNOWN AND PREDICTED ARCHAEOLOGICAL SITES BY SUB-UNIT

<u>Site Types</u> ^{1/}	<u>High Rock</u>	<u>Massacre/ Nut Mountain</u>	<u>Long Valley/ Sand Creek</u>	<u>Mosquito</u>
Base Camps	1	17	6	5
Temporary Camps	5	25	10	22
Quarries	4	28		8
Caves/Rock Shelters	45	33	2	12
Lithic Scatters	25	104	60	82
Petroglyph Sites	1	7	3	6
Hunting Stations		15	8	14
Hunting Blinds		2		1
Milling Stations		1	5	
TOTAL KNOWN	81	232	94	150
TOTAL PREDICTED	2,000	5,900	6,200	6,200
NRHP ^{2/}	4	16	8	12

^{1/} See Appendix for description of site types.

^{2/} NRHP: Known properties believed eligible for nomination to the National Register of Historic Places.

Site Distribution: Four environmental attributes account for most patterns of site distribution: (1) hydrology; (2) topography; (3) ecological sites; and (4) geology.

Hydrology: Predictably, occupation sites (villages, base camps, temporary camps) are always directly associated with seasonally reliable water sources. The converse is also true: few water sources were ignored. A sample of 85 springs has shown an 86-percent incidence of sites. At upland settings (and in low sage habitats) these tend to be base camps and temporary camps. Petroglyphs are frequently associated. In lowland settings (and in big sage, shadscale, and greasewood associations) they tend to be villages or base camps.

A favored setting for occupation sites was at the mouths of drainages feeding into lakes, especially where dunes have been thrown up at the northeast of a playa (dune and slough base camps lie virtually always at the northeastern margin of lakebeds, owing to the dune-forming action of local winds from the southwest).

Topography: There are strong correlations between land form and settlement pattern. Occupation sites of all types avoid slopes. Some non-occupation categories of site (such as hunting stations), however, favor sharp relief. Steep-sided canyons abound with natural caves and rock-shelters, and over 80 percent of these cavities exhibit cultural remains. Canyon rims host numerous hunting stations and lithic scatters as well.

Ecological Sites: Pregrazing ecological factors conditioned many patterns of prehistoric activity, particularly those related to the quest for food (Corson, 1977b). As a result, ecological sites (and especially associations) display great differences in the kind and number of sites which occur within them, owing chiefly to differences in the seasonal availability of plants and animals.

Shadscale associations were sparsely used except where major water sources exist. Sampling indicates an average density of 1.5 sites per square mile, consisting of milling stations and non-diagnostic lithic scatters. One of the principal attractions was doubtless Indian rice-grass, an important subsistence item.

Greasewood associations were likewise little exploited. The random sample indicates an average density of 2.5 sites per square mile, chiefly milling stations and lithic scatters in settings away from water. Because greasewood dominates the lowest basin floors, however, where major springs often erupt, some of the most intensively used base camps occur within the association.

The complex big sage associations offered the greatest ecological diversity in the study area, and they witnessed the greatest diversity of prehistoric activities. All categories of sites with the exception of stone alignments and hunting blinds have been found in these associations. Sampling indicates an average density of 17.1 sites per square

mile, with especially intense use of the big sage/bluebunch wheatgrass ecological site (average density 20.7 sites per square mile). Away from water, these sites consist chiefly of hunting stations and lithic scatters. Base camps and temporary camps occur at springs throughout the range of associations, and in the big sage/basin wildrye ecological site, lakeside villages have been noted.

Low sage associations contain an average of 12.6 sites per square mile. These habitats were especially important in prehistoric hunting patterns, and hunting-related sites are frequent. Temporary camps (always at water) are the most frequent type of occupation site, and most were probably visited by hunting parties. Base camps are rare in these associations, due primarily to the scarcity of important seed plants and grasses.

The minor associations (mountain mahogany, silver sage, Baltic rush, aspen, bluegrass sedge, and pine-fir), each constituting less than 1 percent of the study area, have not been systematically sampled owing to their very diffuse distributions. Often occurring as inclusions in much larger ecological sites, and providing thereby not only species diversity, but several important wildlife habitats, their role in prehistoric cultural ecosystems was significant even though occupation sites were not located within them.

Geology: The distribution of natural obsidian and fine-grained cherts conditions the occurrence of quarries, some of which are the largest sites in the study area. Obsidian sources were always exploited, irrespective of the ecological site in which they lie or their proximity to water. Where water sources lie within them, large quarries may subsume smaller occupation sites or special use areas. Because chert was not the favored material and its exposed deposits are smaller, chert quarries are never so large or intensively used as are obsidian sources.

Factors Currently Affecting Archaeological Sites: Throughout the study area, archaeological sites are suffering deterioration and attrition of their information content. Several factors are contributing; all effect an absolutely irreversible commitment of a non-renewable resource.

Vandalism: Amateur collectors have caused the most severe impacts. The surfaces of sites have been methodically combed each spring for decades, and several massive excavations have been performed. In some instances, features which once made a site significant have been virtually obliterated and its eligibility for the National Register of Historic Places has been impaired. Cave sites have suffered most (24 vandalized caves have been recorded), but open sites too have been looted. Surface collection, as it leaves no trace, cannot be quantified. Four known petroglyph sites have been partially despoiled by vandalism (cartoons and graffiti).

Livestock Grazing: Because they trample the surface, promote devegetation, and contribute to displacement and erosion, livestock have an impact on archaeological sites. Impacts are greatest where livestock congregate around water sources and, since water sites were the chief central places in prehistory, the most intense livestock-related impacts focus at the most important archaeological locales. Seventy percent of the known occupation sites in the study area have suffered from grazing, and all spring-based villages, base camps, and temporary camps which have not been fenced must be counted as vulnerable.

Erosion: Wherever erosion classes are severe, archaeological sites are suffering deterioration. All open sites, and even some rockshelters, are subject to this impact, the effects of which are greatest when they imperil occupation sites with vertical deposits. To the extent that, in certain settings, this erosion is the product of grazing practices, it is a trend within the scope of management to curtail.

Historical Resources

The Lassen/Applegate Trail, a major goldrush route in the late 1840s and early 1850s, ascended High Rock Canyon to the Massacre Lake Basin, dropped into Long Valley, crossed to Forty-nine Pass, ran northwest through Surprise Valley and climbed the Warners at Fandango Pass (Hunt, 1974). Although great numbers passed through the Cowhead/ Massacre area on their way to the gold fields of the Sacramento Valley, settlement of the area did not begin until 1864. In 1865 the garrison of Fort Bidwell was established. By 1870, Lake City and Deep Creek (later Cedarville) were being settled, the latter around the Cressler and Bonner trading post, now a California Historic Landmark.

Placement of Fort Bidwell was conditioned by the need to protect the Surprise Valley-Puebla Road, a branch of the Chico-Idaho Road between California and the Owyhee mining district. Fort Bidwell was soon eclipsed by Lake City and, later by Cedarville. At its abandonment by the military in 1893, the fort was converted to a school for Indian children.

The long tradition of uneasiness between Indians and settlers was accompanied by tales of real and imagined massacres. Layton (1978) has argued convincingly that the massacre which gave Massacre Lake its name in reality never took place. Climax of these tense relations occurred in 1911 with the murder in Little High Rock Canyon of four Surprise Valley stockmen, which sparked one of the most celebrated manhunts in local history.

Outside of Surprise Valley, large cattle and sheep herding enterprises exploited the Cowhead/ Massacre range well beyond its capacity. The impact of sheep was especially severe--it was considered unprofitable to run less than 1,000 sheep. Although it was realized that overgrazing was deteriorating the range, 150,000 sheep were ranged in Surprise Valley as late as 1920 (Olmstead, 1957). The resulting attrition of grasses, dominance of shrubs, and related erosion, all persisting today, commemorate, however undesirably, an historical practice which was the foundation of the region's lifeway.

Native American Heritage Values

The contemporary Native American community resident in Cowhead/Massacre, whose predecessors left the archaeological record discussed above, holds certain values in the landscape which do not coincide with Anglo values or current uses. While traditional culture has been much altered and most elements of the native lifeway have lapsed, various features of the countryside still figure in religious or ceremonial belief, in local tradition, and as components of the local heritage.

In order to understand better the nature of these values and to identify specific areas of heritage significance which might be adversely impacted by the proposed action, consultation with members of the local Native American community has been initiated. Inquiry has focused especially on the location of burial grounds, ceremonial sites, and sacred places, with the assurance that such information will be held in strict confidence to protect the integrity of these values. The intent has been to elicit information on heritage values which might be compromised or destroyed inadvertently through proposed grazing systems, the construction of range facilities, or vegetative manipulation.

Thus far, five informants from the Fort Bidwell community (ages ranging from 30-70) have contributed information on Native American heritage values lying within the Cowhead/Massacre area. We have so far identified two burial grounds and various traditional gathering sites, although the proposed action bypasses these as they lie largely on currently private lands. As Native American concerns have been expressed regarding the preservation of petroglyph sites, ongoing consultation is planned in anticipation of the management of these places. The compass of our inquiry will expand as site specific projects demand.

National Register of Historic Places

No sites on public lands are currently listed on the National Register (Federal Register February 7, 1978), and only one property (the Lassen-Applegate Trail Corridor) has so far been nominated. Application of the criteria described in 36 CFR 800 to the resources identified by BLM-initiated surveys has resulted in the identification of 51 sites likely eligible for nomination individually or as components of districts. Area-wide, some 2,000 sites might equally qualify.

The evaluation of archaeological sites relies heavily on information content as an index of significance, particularly to the extent that information can be translated into data for the solution of problems important in the understanding of prehistory. Among the attributes which confer significance are great size, age, depth, abundance of material, and superior preservation.

All villages and most base camps, because they were foci of concentrated activity and have often accumulated vertical deposits, are the best source of information on chronology, social organization, and many elements of cultural ecology. Twenty-five such sites are known; all are potential National Register properties.

Dry caves with occupation deposits, where unvandalized, are unique storehouses of data on material culture and ecological adaptation; much of the framework of Great Basin prehistory has been learned from them. Nine known caves in Cowhead/Massacre are probably eligible for the National Register.

Extensive petroglyph series constitute important windows onto prehistoric magico-religious practices, and often co-occur with open sites, themselves of considerable research potential. Nine presently known petroglyph localities are likely National Register candidates.

While temporary camps are variable in size and density, many share those qualities which confer significance on villages and base camps. As a category, in fact, they take on special significance in that they so far have been little studied in the Great Basin and constitute a largely untapped data base. Eight presently known temporary camps are apparently eligible for National Register nomination.

Small, sparse, or heavily disturbed temporary camps, as well as diffuse lithic scatters, hunting stations, hunting blinds, milling stations, isolated petroglyphs, and rockshelters with no vertical deposit are seldom likely to be National Register candidates on an individual basis. Collectively, however, the information they provide is crucial for an understanding of prehistoric land use patterns. Their unique data are not replicated at the ostensibly more "significant" occupation sites. In certain instances, the close juxtaposition of several sites constitutes theatres of prehistoric activity probably eligible for the National Register as archaeological districts.

Sub-Unit 1, High Rock

The canyonlands of this subunit are among the most ecologically complex portions of the study area. Sharp topographic relief, a high species diversity, and several reliable water sources made the region attractive to prehistoric inhabitants, as witnessed by the great numbers of archaeological sites which occur there. Layton (1968, 1970, 1972) suggests an antiquity of occupation spanning the last 12,000 years. The sub-unit has enormous research potential, particularly a large number of dry caves.

The archaeological richness of the canyonlands has attracted the most intense vandalism in the study area. Caves, particularly, have been looted for over two decades and open sites annually have been cleaned of surface artifacts.

Historic use of the canyonlands enhances their cultural value. A major segment of the Lassen/ Applegate Trail passes along High Rock Canyon, largely coincident with the existing road. Several of the early passers-through left graffiti, chiefly names and dates, carved in the walls or painted upon them in axle grease (see FIGURE 2-2).

Five homesteads and line cabins, including the remains of one plank and five stone and pole structures, relate to the early grazing history of the area.

The 1911 massacre in Little High Rock Canyon of four Surprise Valley stockmen has been commemorated by a sign at the site of the event, and has generated several books and articles (Mack, 1968; Hyde 1973).

National Register of Historic Places: The Nevada portion of the Lassen/ Applegate Trail corridor has been nominated to the National Register. TABLE 2-16 presents other sites and districts currently believed to be eligible for nomination to the Register in this sub-unit.

Sub-Unit 2, Massacre Mountain/Nut Mountain

This sub-unit displays in a small area a nearly complete cross-section of the prehistory of the study area. The lake margins and dunes, especially at the mouths of seasonal drainages, contain numerous large base camps related to a long-term lake and marsh oriented cultural ecosystem. Temporary camps occur at most major upland springs, and on the Massacre Bench they are often accompanied by extensive petroglyphs. Obsidian quarries are abundant, both within the basin and in the surrounding hills. Several caves, as well as hunting sites and lithic scatters, are known. Known and predicted sites are summarized in TABLE 2-17. The information content of archaeological sites here is presently poorly known, although the activities of vandals along the Massacre Lake margin have exposed substantial subsurface deposits.

The Lassen/Applegate Trail crosses the sub-unit from east to west; a few distinct stretches deviate from the modern road. The later livestock enterprises are represented by six homesteads and line camps, including a northern satellite of the vast Miller and Lux cattle empire.

In the summer of 1968 artist Michael Heizer executed a 120-foot meandering ditch, titled Circumflex, on the western portion of the bed of Massacre Lake. The work formed one element of a commissioned series of earthworks on 12 dry Nevada lakebeds. Fleeting national attention was conferred by publication of a full-page photograph of Circumflex in the Saturday Evening Post (Junker, 1968). Successive inundations of Massacre Lake will eventually obliterate the figure, nearly indistinguishable in 1978.

National Register of Historic Places: Only the Lassen/Applegate Trail corridor has so far been nominated to the National Register. The sites and districts listed in TABLE 2-18 are believed to qualify for nomination.

TABLE 2-16

Sites of National Register Quality
Sub-Unit 1, High Rock

<u>Site</u>	<u>Attributes and Condition</u>
Little High Rock Canyon	Archaeological and historic district, approximately 800 acres. Complex of 26 caves, open sites, and quarries, many heavily vandalized. Site of 1911 massacre. Retains considerable research potential.
Conlon Camp Meadow	Archaeological district, approximately 200 acres. Complex of 15 caves, open sites, and a large temporary camp. Two caves heavily vandalized. Includes 'Swallow Marsh shelter,' professionally excavated (Layton, 1970).
AR04-02-632	Archaeological district, approximately 50 acres.
AR04-02-633	Large base camp/temporary camp at spring with four
AR04-02-822	associated rockshelters. Vertical deposits intact
AR04-02-905	save for severe gullying below spring.
AR04-02-906	
AR04-02-295	Large base camp at spring. Intact vertical deposits, little apparent disturbance aside from sheet erosion.

TABLE 2-17

KNOW AND PREDICTED ARCHAEOLOGICAL SITES
SUB-UNIT 2, MASSACRE MOUNTAIN/NUT MOUNTAIN

Site Types	<u>MANAGEMENT AREAS</u>				
	A	B	C	D	E
Base Camps			6	10	1
Temporary Camps	1	2	4	3	15
Quarries			2		26
Caves/Rock Shelters			1	7	25
Lithic Scatters	1	4	24	7	68
Petroglyph Sites		5	2		
Hunting Stations			4	3	8
Hunting Blinds				1	1
Milling Stations			1		
TOTAL KNOWN	2	11	44	31	144
TOTAL PREDICTED (Approx.)	400	500	700	100	4,100
NRHP*	1	4	3	3	5

*NRHP: Known properties believed eligible for nomination to the National Register of Historic Places.

TABLE 2-18

Sites of National Register Quality
 Sub-Unit 2, Massacre Mountain/Nut Mountain

<u>Site</u>	<u>Attributes and Condition</u>
AR04-02-7	Archaeological district, approximately 1,300 acres. Complex of seven major base camps, one dry cave, and two lithic scatters. Cave and all base camps preserve vertical deposits. Cave and one base camp partially vandalized (excavated); all sites probably surface collected. One base camp suffering ORV usage. All base camps show severe cattle trampling.
AR04-02-8	
AR04-02-9	
AR04-02-10	
AR04-02-36	
AR04-02-37	
AR04-02-847	
26-Wa-9	Two prehistoric base camps and an historic sheep-herding cabin dating from before 1930. Both base camps have undisturbed vertical deposits, apparently unvandalized. Severe trampling.
Coops 17	
Evans Camp	
Coops 14	Archaeological district, approximately 700 acres. Complex of six very large lake-margin base camps and lithic scatters. One camp has been severely disturbed by a crested wheat seeding; all have been intensively surface collected. Large intact vertical deposits. (Public and private land.)
Coops 15	
AR04-02-806	
AR04-02-807	
AR04-02-808	
AR04-02-809	
AR04-02-810	Archaeological district, approximately 360 acres. Complex of three large lake-margin base camps and two obsidian quarries. Large intact vertical deposits. Heavily surface collected, severe trampling. (Private land.)
AR04-02-1110	
Coops 4	
Coops 5	
Coops 6	
Coops 7	
Coops 8	Large cave/base camp with abundant occupation deposit above major drainage. Heavily vandalized, approximately 50 percent intact. Retains considerable research potential.
AR04-02-360	
AR04-02-1066	Large rockshelter with occupation deposit above major drainage. Pristine condition.

TABLE 2-18 (continued)

<u>Site</u>	<u>Attributes and Condition</u>
AR04-02-1127	Very large petroglyph locale and upland temporary camp. Hundreds of design elements, possible slight vertical deposit. Superior integrity.
26-Wa-2456	Large petroglyph series and upland camp at spring. Possible slight vertical deposit. Spring has been developed and fenced.
Hanging Rock Shelter	Large cave/base camp, professionally excavated and reported (Layton, 1970).
AR04-02-736 AR04-02-737 AR04-02-738	Archaeological district. Small cave, small rock-shelter, and temporary camp at head of major drainage. Cave and rockshelter are pristine; camp suffering sheet erosion.
AR04-02-712	Large base camp at bank of seasonal drainage. Some vertical deposit, artifacts suggestive of considerable antiquity. Traversed by dirt road. Slight trampling.
AR04-02-618	Large temporary camp at upland spring. Very dense surface scatter of chippage and hunting-related artifacts, possible small vertical deposit. Possibly surface-collected.
AR04-02-690	Upland temporary camp at spring with associated petroglyph and hunting blinds. Long sequence, apparent depth. Considerable cattle trampling.
AR04-02-691	Large upland temporary camp with associated major petroglyph series. Possible vertical deposit. Superior integrity.
AR04-02-283	Base camp at spring with multifunctional assemblage and probable vertical deposit. Some cattle trampling.
AR04-02-297	Large temporary camp/base camp at spring. Multifunctional assemblage, including quarry materials (obsidian source). Some vandalism, cattle trampling, erosion.

Sub-Unit 3, Long Valley/Sand Creek

In Surprise Valley, even along the arid eastern margin, large occupation sites exhibit long sequences of use, especially where hot springs break out on the valley floor 6,500 years of intermittent occupation are indicated. Long Valley also supported major base camps, especially in the dune systems flanking seasonal lakes. The valley floors do not contain concentrations of sites away from water.

The Hays Canyon range separating the two valleys contains lithic scatters and, at springs, temporary camps. A major petroglyph series occurs near the sub-unit's northern boundary, comprising one element of a large complex of petroglyph sites occupying the Mosquito Sub-Unit.

Vandalism has focused on the Surprise Valley occupation sites where large excavations have occurred on private land. The Long Valley occupation sites have been surface-collected. One cave deposit has been completely destroyed.

A remnant of the Lassen/Applegate Trail deviates from the route of modern Nevada Highway 8A west of "49" Pass, and descends into Surprise Valley. Of the homesteading and early ranching era there are few traces (and no standing structures) on public lands.

National Register of Historic Places: TABLE 2-19 summarizes known and predicted sites in this sub-unit. Only the Lassen/Applegate Trail corridor has so far been nominated to the National Register. The sites and districts shown in TABLE 2-20 are believed to qualify for nomination.

Sub-Unit 4, Mosquito

The abundance of archaeological sites in the area suggests that seasonal use had long tenure. Camps occur at most springs, often associated with petroglyphs. Large upland lake and marsh systems are accompanied by major base camps and, again, petroglyphs.

The northern portion of the sub-unit, from Cowhead Lake to Mosquito Valley, contains highly dissected landscapes with interdigitated ecological sites. Moreover, obsidian sources are frequent (including an historically exploited flow; Kelly, 1932). The highest site densities recorded during the 1977 season occur here. A survey of the proposed Pacific Northwest-Pacific corridor (Weber, Peak, and Gerry, 1977) recorded a number of stone "intaglio." These have not yet been verified by field examination.

Early historic occupation centered in the northern reach of Surprise Valley and in the Cowhead Lake basin. All but one of the homesteads remain in the private sector.

TABLE 2-19

KNOWN AND PREDICTED ARCHAEOLOGICAL SITES
SUB-UNIT 3, LONG VALLEY/SAND CREEK

<u>Site Types</u>	<u>Management Area A</u>	<u>Management Area B</u>
Base Camps	1	5
Temporary Camps	6	4
Caves/Rock Shelters	1	1
Lithic Scatters	33	27
Petroglyph Sites	3	
Hunting Stations	2	6
Milling Stations	2	3
 TOTAL KNOWN	 48	 46
TOTAL PREDICTED (Approx.)	2,800	3,400
 NRHP*	 4	 4

* NRHP: Known properties believed eligible for nomination to the National Register of Historic Places.

TABLE 2-20

Sites of National Register Quality
 Sub-Unit 3, Long Valley/Sand Creek

<u>Site</u>	<u>Attributes and Condition</u>
AR04-02-919	Archaeological district, approximately 200 acres.
-921	Complex of two lake margin villages, large temporary
-927	camp, three lithic scatters, and a milling station.
-923	Long sequence, good vertical deposits. Reported to
-924	be heavily surface collected.
-925	
-926	
AR04-02-1044	Archaeological district, approximately 100 acres.
AR04-02-1045	Pair of large base camps at shore of seasonal lake.
	Multifunctional assemblages, probable vertical de-
	posits. Powerline and dirt road immediately adjacent.
AR04-02-830	Extensive petroglyph series and associated lithic
	scatter. Virtually pristine.
AR04-02-287	Large base camp at spring. Dense surface scatter,
	multifunctional assemblage, vertical deposit, long
	sequence. Spring has been developed and fenced,
	dirt road transects site. (Partially private owner-
	ship.)
AR04-02-288	Large base camp at spring. Dense chippage, strongly
	developed milling stone component. Probable vertical
	component. (Partially private ownership.)

The sub-unit was crossed by the Chico-Puebla road which led to the Owyhee mining district. A trace of the old road is still detectable near Bally Mountain.

National Register of Historic Places: No places are currently listed on the National Register. TABLE 2-21 lists the number of known and predicted sites in the area. The sites listed in TABLE 2-22 are believed to qualify for nomination.

Recreation

Recreational Use

Recreational use in the Cowhead/Massacre Planning Unit is light. User estimates for 1976 summarize total use at 34,085 annual visitor days (Cowhead/Massacre URA, 1977) with hunting, rockhounding, camping, and sightseeing accounting for 90 percent of all activities (TABLE 2-23). Visitors to the area are primarily from California (40 percent) and Nevada (56 percent). Most recreational use is dispersed and unregulated. Destination-oriented use occurs primarily in High Rock Canyon, at selected rockhounding areas, and at favorite hunting camps during the fall. Most recreational activities are engaged in without the benefit of facilities. One small 12-unit county campground adjacent to BIM's Fee Reservoir is the only developed site within the unit. State and county roads traverse all major regions of the planning unit and numerous rough roads and trails provide access to most remote areas. Use of these roads and trails is an essential component of the area's recreational use.

Most use occurs in the upland or canyon areas where diversity in terrain and vegetation afford increased opportunities for, and quality of, sightseeing and camping. MAPS 2-7 and 2-8 show use areas where specific activities occur. Rockhounding occurs throughout the unit; however, areas shown on MAP 2-7 receive most of the interest because of higher concentrations of minerals. Hunting in these areas is predominantly for deer and upland game birds. Antelope quota hunting and limited waterfowl hunting account for the balance of the area's hunting use. Suitable habitat for quality stream fishing is lacking throughout. Low-quality stream fishing is available only in segments of Twelve Mile Creek. Moderate-quality warm-water lake fishing is available at only Fee Reservoir.

Off-road vehicle (ORV) use, as an individual activity, is very limited. Other than occasional use of the small sand dunes and alkali lake beds of Surprise Valley, the majority of use is directly associated with other recreational activities. No organized competitive events have been held in the area.

TABLE 2-21

KNOWN AND PREDICTED ARCHAEOLOGICAL SITES
SUB-UNIT 4, MOSQUITO

Site Types	<u>MANAGEMENT AREAS</u>		
	A	B	C
Base Camps	1	2	2
Temporary Camps	7	9	6
Quarries	4	3	1
Caves/Rock Shelters	4	1	7
Lithic Scatters	24	31	27
Petroglyph Sites	1	4	1
Hunting Stations	11		3
Hunting Blinds		1	
 TOTAL KNOWN	 52	 51	 47
TOTAL PREDICTED (Approx.)	1,200	2,000	3,000
 NRHP*	 1	 6	 5

* NRHP: Known properties believed eligible for nomination to the National Register of Historic Places.

TABLE 2-22

Sites of National Register Quality
Sub-Unit 4, Mosquito

<u>Site</u>	<u>Attributes and Condition</u>
AR-04-1070	Archaeological district, approximately 80 acres.
AR-02-1071	Pair of large upland lake basin campsites (base camp and temporary camp), one with probable vertical deposits. Base camp is crossed by jeep trail, otherwise nearly pristine.
AR-02-666	Archaeological district, approximately 120 acres.
AR-02-667	Two large temporary camps, two rockshelters, two
AR-02-668	lithic scatters. District subsumes early 20th
AR-02-669	Century homestead in fair condition (standing
AR-02-939	house, corral, outbuildings), reverted to public
AR-02-956	domain in 1937.
AR04-02-685	Large temporary camp at spring with dense surface lithic scatter and possible slight vertical component. Disturbance from construction of powerline and road at periphery.
AR04-02-615	Large base camp and extensive petroglyph series within and adjacent to gorge of major seasonal drainage. Some vandalism (grafitti) of petroglyphs.
A04-02-281	Large base camp at spring complex. Dense surface scatter, probable vertical deposit. Transected by fence line, moderate erosion. (Private land.)
AR04-02-1041	Large, multifunctional temporary camp including an obsidian quarry, petroglyphs, four rockshelters, four hunting blinds, and a bedrock mortar. Transected by dirt road.
AR04-02-289	Large base camp at spring with multifunctional assemblage, probable vertical deposit. Time markers suggest long sequence. Transected by jeep trail; moderate to severe erosion.
AR04-02-290	Petroglyph series associated with base camp at spring. Multifunctional assemblage, possible depth. Transected by jeep trail.

TABLE 2-22 (continued)

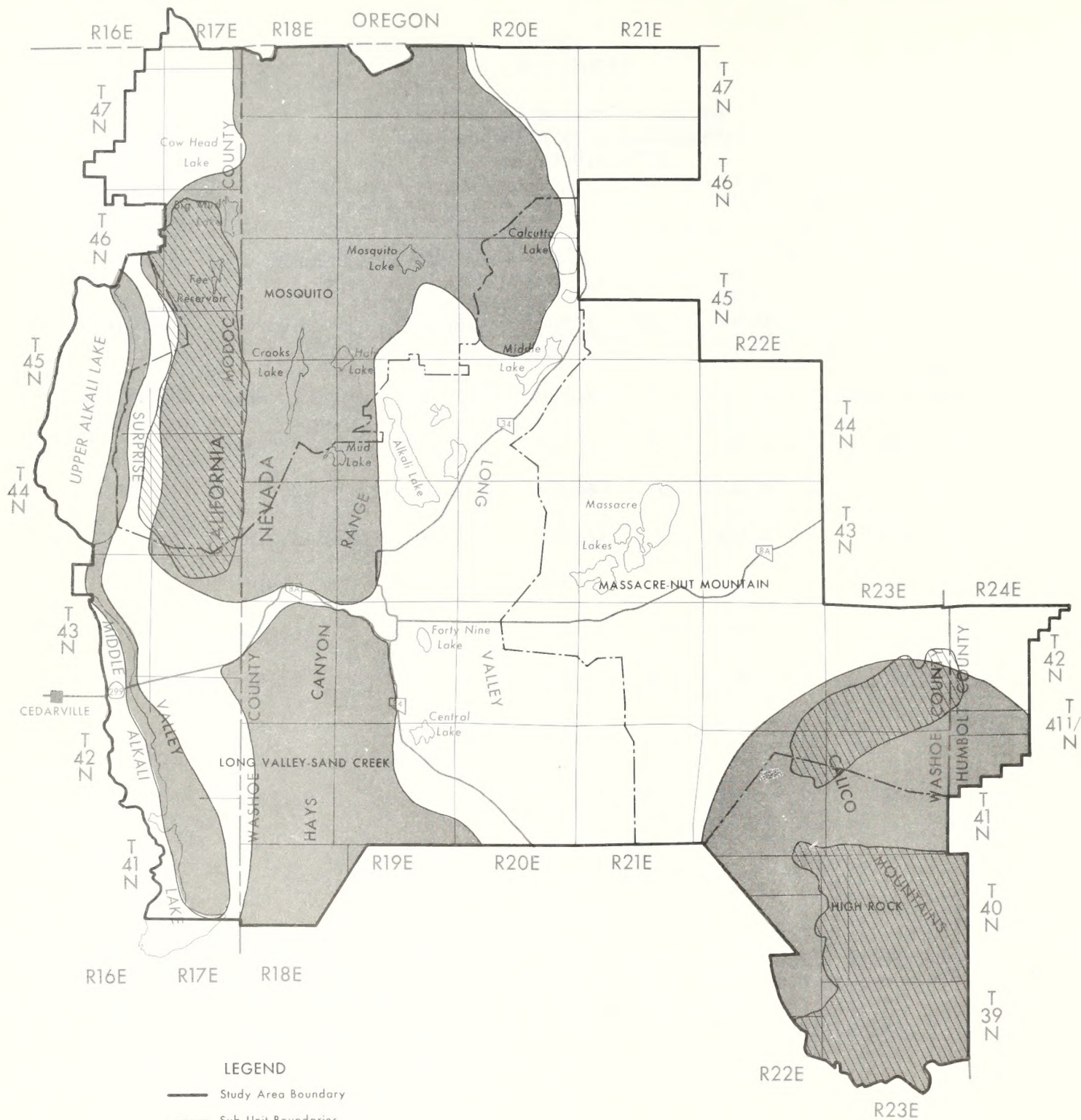
<u>Site</u>	<u>Attributes and Condition</u>
AR04-02-671	Archaeological district, approximately 120 acres.
AR04-02-672	Complex of three temporary camps with associated
AR04-02-673	series of petroglyphs exhibiting heavy repatination and superimposition. Depiction of horsemen. Little disturbance, though adjacent to dirt road.
AR04-02-1111	Extensive petroglyph series associated with temporary camp above upland lake. Virtually pristine.
AR04-02-729	Large spring-based temporary camp and associated
AR04-02-730	rockshelter. Spring has been developed and meadow fenced; dirt road and jeep trail cross camp site.
AR04-02-607	Base camp at spring in bottom of seasonal drainage. Slight vertical deposits, complex multifunctional assemblage. Severe erosion.

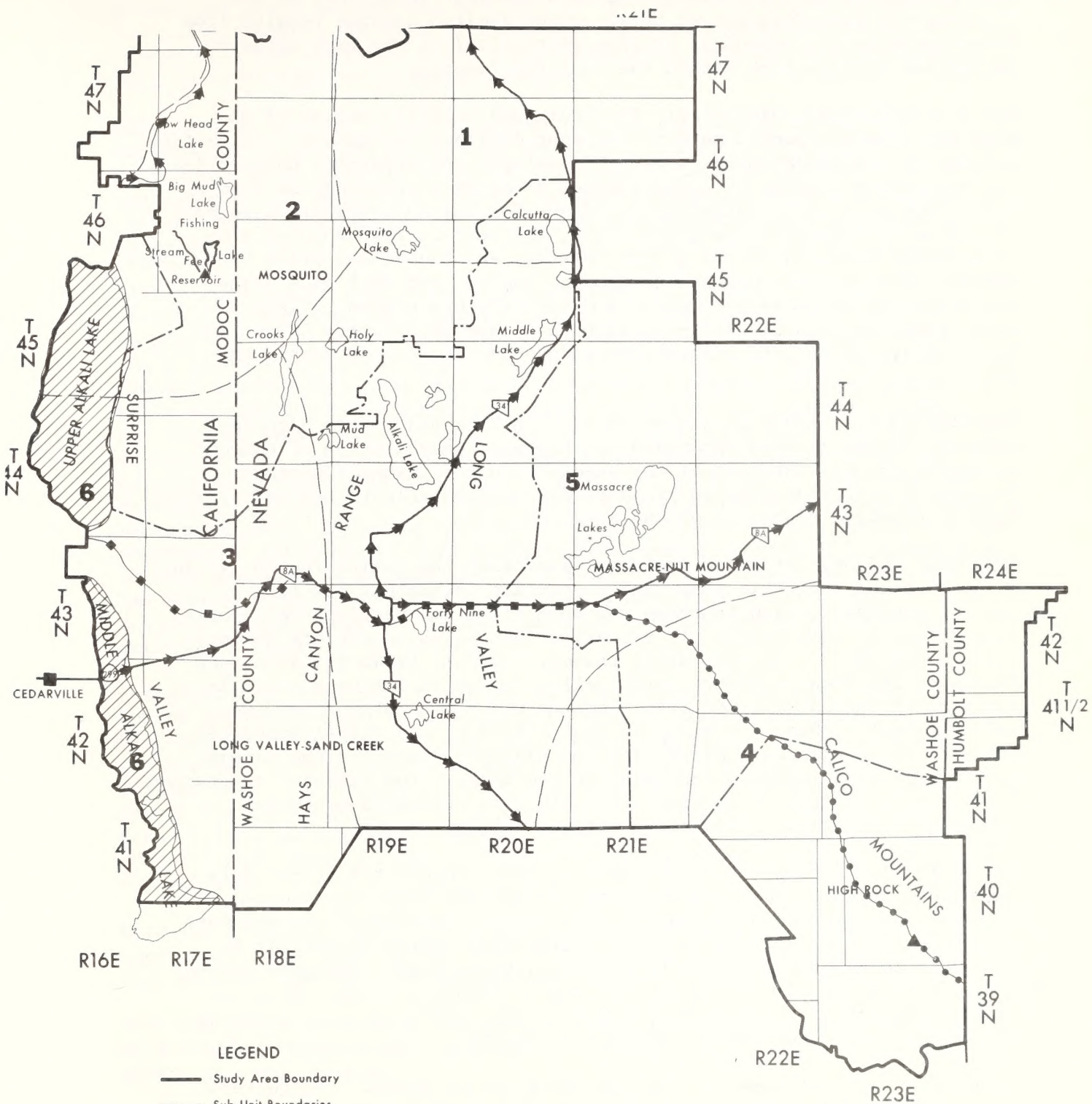
TABLE 2-23

Estimated Recreational Use
Cowhead/Massacre Planning Unit
1976, 1980, 1990

<u>Activity</u>	<u>Activity Occasions</u>					
	1976	%	1980	Annual % Inc. 1976-1980	1990	Annual % Inc. 1980-1990
Off-road vehicle use	1,732	5	2,060	5	2,756	3
Sightseeing	4,781	14	5,695	5	7,648	3
Camping	5,161	15	6,094	5	8,050	3
Rockhounding	9,468	27	11,346	5	15,226	3
Hiking	662	2	744	3	917	2
Hunting	11,242	34	12,609	3	16,480	3
Picnicking	692	2	822	5	1,102	3
Other	347	1	415	5	554	3
TOTAL	34,085	100%	39,785	36%	52,733	23%

Sources: Data calculated from 1973 Cowhead/Massacre visitor estimates. Growth rates utilized are those established for northwestern Nevada in the Nevada Statewide Comprehensive Outdoor Recreation Plan, 1977.





**COWHEAD/MASSACRE
STUDY AREA
GRAZING ENVIRONMENTAL STUDY
HUNTING AND SIGHTSEEING**

Most camping is directly associated with hunting, rockhounding, and visiting the High Rock Canyon area. Other limited camping results from travelers stopping overnight or from recreationists who have selected particular destinations within the area for camping.

The archaeological, historical, physical, and wildlife values of the High Rock Canyon complex make it the most distinct recreational attraction within the Cowhead/Massacre area. Undeveloped and presently unsupervised, the six-canyon complex receives low but steadily increasing use from a wide range of outdoor enthusiasts. Known for the well-preserved segment of the Lassen/Applegate Emigrant Trail, the area is also popular with archaeology buffs, wildlife groups, hikers, and four-wheel-drive enthusiasts. Canyon use occurs throughout the spring, summer, and fall with highest use occurring on three-day weekends during the use season. Visitors come primarily from the Reno-Sparks area of Nevada and from Oregon and California, however, travelers from throughout the West frequent the area.

The High Rock Sub-Unit is dominated by High Rock and Little High Rock Canyons. These canyons encompass the highest concentration of outdoor recreational opportunities of any area within the Cowhead/Massacre region. These opportunities are directly attributable to the undisturbed, rugged, physical character of the area.

High Rock Canyon, the major drainage dissecting the entire region, is 14 miles long and varies in shape and proportion throughout its length. Much of the main canyon is broad and open with high vertical walls above long slopes of rock talus. In two areas the canyon constricts abruptly to form narrow, vertically walled chasms. Reddish brown volcanic rock dominates the area, however, large yellow and white outcrops occur in portions of the canyon. Colorful lichens plate many of the massive vertical walls. Scenic quality is high (Class A, see Visual Resources, below). An intermixture of grasses and big sage dominates the canyon bottom with large meadows occurring in two areas. Low riparian vegetation forms a narrow strip of lighter green along the canyon's perennial stream. Shade trees do not occur within High Rock itself.

The four side canyons vary considerably. The longest tributary, Pole Canyon, contains the only aspen stands within the High Rock complex. Although broad and open for much of its length, Pole Canyon is the most convoluted of all the tributaries. Yellow Rock Canyon is similar in character to upper High Rock, both being dry and open. Mahogany and No Name, like Little High Rock, are the most confined canyons. Deep and narrow for much of their length, these canyons offer the most striking angular contrasts throughout the canyon complex.

Archaeology enthusiasts have visited the area for years. "Pothunters" have illegally dug many sites within the High Rock Canyon complex but others still remain undisturbed. Knowledge of the area's Indian relics continues to spread, attracting more visitors annually.

Historical trail enthusiasts are fond of the High Rock region because of the well-preserved remnants of the Lassen/Applegate Emigrant Trail. Individuals and organized trail groups regularly make the trip to High Rock for overnight or extended outings.

Captain John Charles Fremont traveled through the canyon on his epic exploration of western America in 1843-1845. Pioneers utilizing the Lassen/Applegate Emigrant Trail relied heavily upon the forage and water available within High Rock Canyon. Between 10 and 20 thousand pioneers heading for Oregon and California passed through the canyon between 1849-1852.

Little has changed since the pioneers traversed the area. Present visitors to High Rock are able to experience the rugged desert terrain as pioneers first experienced it over a century ago. The present jeep trail through the canyon bottom closely follows the old wagon route. Pioneer inscriptions from 1849-1852 are readily apparent on the canyon walls and remnant wagon ruts are evident where the trail diverges from the present jeep route. Strong interest in preserving these remains of America's 19th Century western migration have prompted individuals and historical groups to advocate establishment of an Emigrant Trail National Monument which would incorporate High Rock Canyon into a larger protective management unit, including portions of the Black Rock Desert to the southeast. The National Park Service would assume management responsibility if this proposal is accomplished. Presently, the National Park Service has made no commitment to incorporate this area into the National Monument System, however, it has plans for a field review of the area during the summer of 1979.

Designation of High Rock Canyon as part of a larger, national border-to-border National Desert Hiking Trail is also pending. The scenic and historic values of the area are the primary considerations for routing the northern Nevada portion of the trail through High Rock Canyon. Initial study for routing of this trail, mandated by the revised National Scenic Trails Act of 1976 (P.L. 94-527) was conducted by the Heritage Conservation and Recreation Service during 1977-78. Further study and Congressional authorization are required before trail designation is accomplished.

Wildlife diversity within High Rock region affords visitors excellent opportunities to observe and enjoy unique birds of prey, antelope, deer, and numerous species of small game and nongame animals.

Deer and antelope hunting is good throughout the sub-unit. Upland game bird hunting attracts many visitors with chukar, quail, dove, and sage grouse the most popular.

Hiking opportunities are good although use is low. The side canyons are particularly appealing to the visitor on foot. Scenery is rugged, natural integrity prevails, and opportunities for exploration and physical challenge are numerous.

Access to all but the outer edges of the High Rock complex requires four-wheel-drive vehicles. Most visitors remain for two or more days. The area is entirely undeveloped, requiring campers to be self-contained and self-sufficient.

Visual Resources

The visual resource is comprised of the land, water, vegetation, animals, and other visible features of an area. Assessment of the visual resources of the study area was conducted under the guidelines of BLM Manual 8400, Visual Resource Management. This evaluation has set standards of allowable visual change within the rated areas.

Determination of a Visual Resource Management (VRM) class is based on three factors: (1) a scenic quality rating, (2) a sensitivity evaluation, and (3) a visual zone map (the location of each viewing area from a use area such as a road, river, or observation point). The scenic quality rating system evaluates individual distinct scenic areas within the planning unit and compares them with the overall physiographic region. (MAPS 2-9 and 2-10). The rating results place the areas in one of three categories, A, B, or C, which are illustrated in FIGURES 2-1, 2-3, and 2-4.

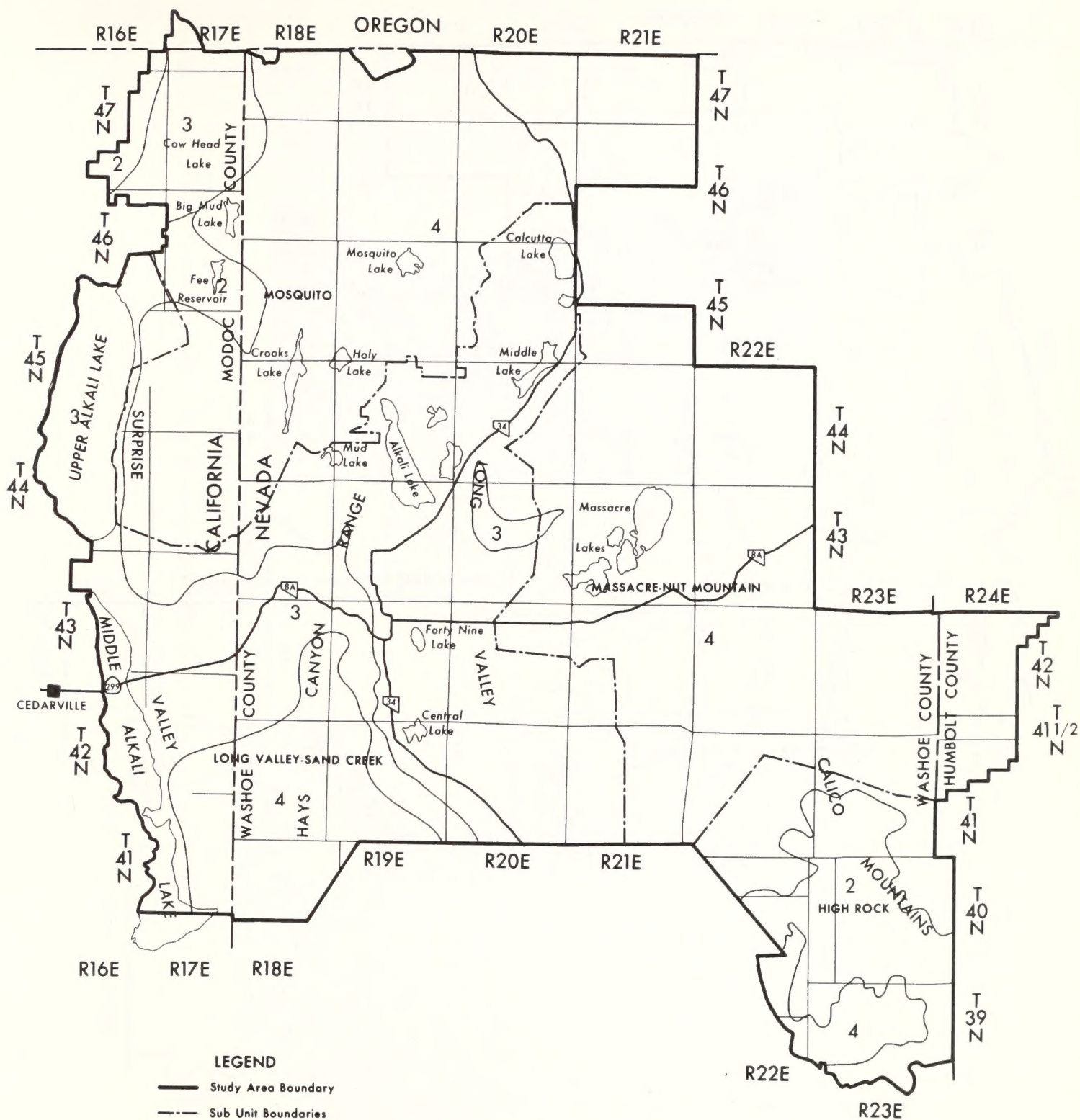
Class A scenery in the planning unit is limited to the High Rock Canyon area. The rugged canyon walls, narrow side canyons, and varied strata in this undeveloped natural terrain provide high scenic interest.

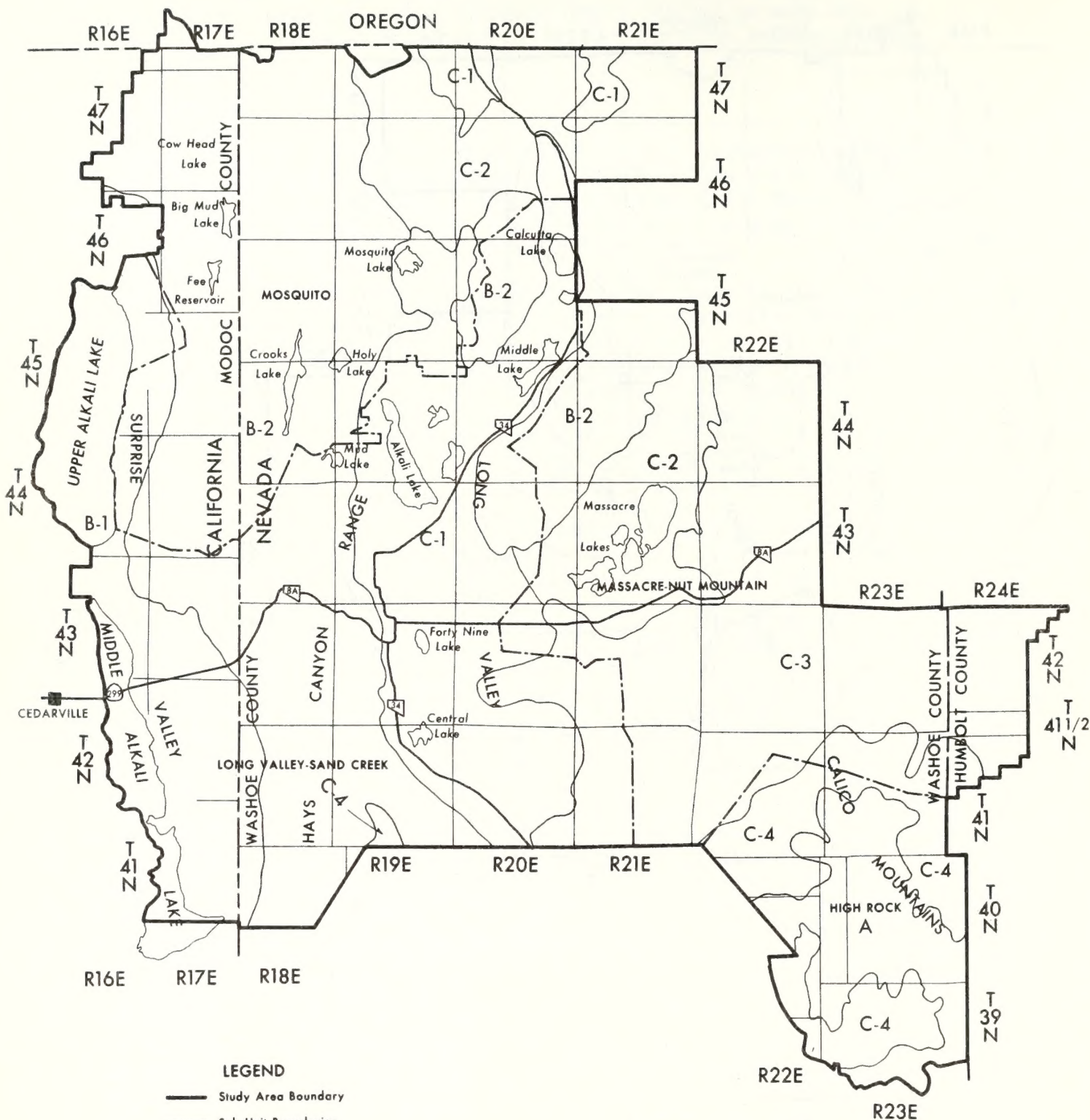
Class B scenery is located along the eastern edge of the Warner Mountains including Surprise Valley, throughout the Hays Canyon/Coleman Mountain region, and on the higher elevations of Bald Mountain. These areas offer a mixture of angular, arid topography, rolling juniper woodlands, aspen groves, and springs. Most of the region is undeveloped; however, evidences of man such as old cabins, ranch houses, corrals, fences, roads, and reservoirs are present.

The remainder of the planning unit is Class C scenery. This classification includes Long Valley, Coleman Valley, the Massacre Lakes area and the upper rim areas of the High Rock sub-unit. The landscape in these areas is primarily brush covered dry lake basins and rolling sage and grass covered hills. Color and texture in these areas is monotonous. Line and form, though varying, represent basic repetitions of similar land features and add little to the scenic interest of the areas.

Wilderness

Four roadless units totalling 181,165 acres are identified as Wilderness Study Areas (WSAs). Two additional roadless units totalling 91,320 acres have been recommended for WSA status in the preliminary wilderness inventory recommendation. However, a final wilderness inventory decision will not be made for these two units, as well as five other units preliminarily recommended as non-WSA until November, 1980.





**COWHEAD/MASSACRE
STUDY AREA
GRAZING ENVIRONMENTAL STUDY
SCENIC QUALITY AREAS**

FIGURE 2-1

Class A (high quality) scenery - High Rock Canyon. Lassen/Applegate Emigrant Trail in lower foreground.

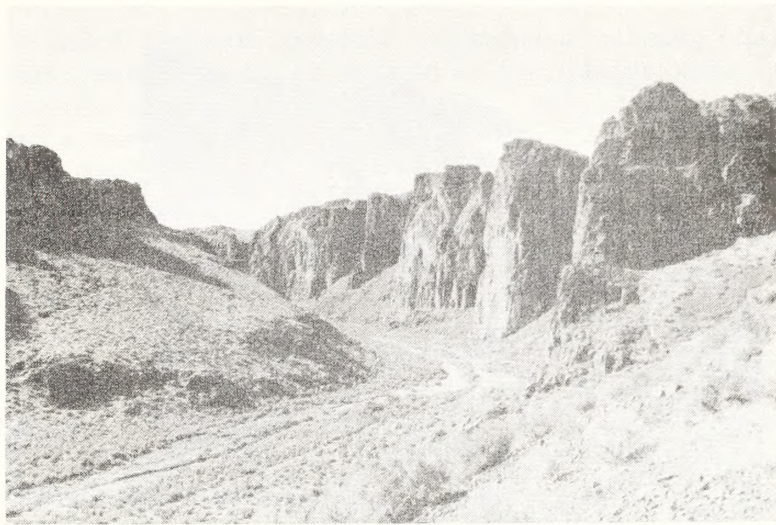


FIGURE 2-2

Pioneer inscription on High Rock Canyon wall along Lassen/Applegate Emigrant Trail.

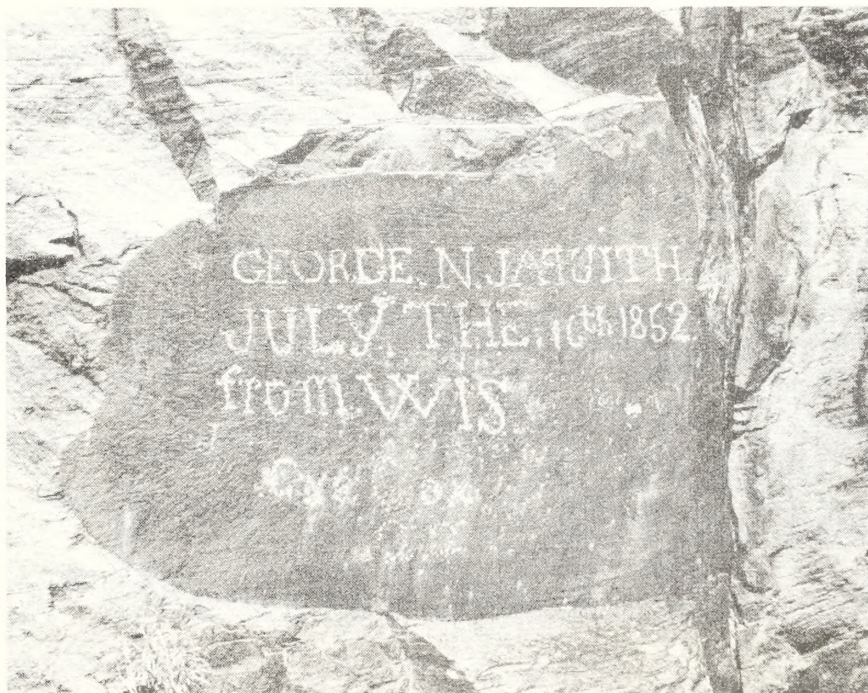


FIGURE 2-3
Class B scenery (moderate quality)



FIGURE 2-4
Class C scenery (poor quality)



Sub-Unit 1, High Rock: Sub-Unit 1 contains portions of 2 WSAs (Yellow Rock Canyon; CA-020-913A, 13,050 acres, and High Rock Canyon; CA-020-913B, 33,985 acres) and two roadless units recommended for WSA status (Little High Rock; CA-020-913, 44,870 acres and E. Fork High Rock Canyon; CA-020-914, 46,450 acres).

These roadless units contain numerous wilderness values. Many steep, colorful canyons, buttes and plateaus with impressive rock formations provide outstanding scenery for sightseers. High raptor and wild horse populations and a variety of other wildlife species provide abundant wildlife viewing opportunities while upland game bird, deer and antelope hunting is also popular. Numerous archaeological sites add interest to the area while remains of the Lassen/Applegate Trail, a major goldrush route in the late 1840's and early 1850's, can still be seen in places within High Rock Canyon. The numerous canyons, intermittent streams and springs provide excellent opportunities for hiking, horseback riding and camping.

Sub-Unit 2, Massacre Mountain/Nut Mountain: Sub-Unit 2 contains most of the Massacre Rim WSA (CA-020-1013; 110,000 acres) and the northern part of High Rock Canyon WSA (CA-020-913B).

These WSAs contain numerous wilderness values. The High Rock Canyon wilderness values are described under Sub-Unit 1. Although the Massacre Mountain WSA lacks significant vegetative diversity, some topographic variation including dry lakebeds, rolling hills with shallow drainages and an impressive rimrock wall 12 miles long provides some sightseeing opportunities. The WSA also contains significant archaeological resources, high wild horse populations and supports a good population of raptors. Antelope, deer and upland game bird populations provide hunting opportunities.

Sub-Unit 3, Long Valley/Sand Creek: Sub-Unit 3 contains only a small portion of the Massacre Rim WSA (CA-020-1013) and the Sheldon Contiguous WSA (CA-020-1012) described under Sub-Unit 2 and 4 respectively.

Sub-Unit 4, Mosquito: Sub-Unit 4 contains most of the Sheldon Contiguous WSA (CA-020-1012; 24,130 acres). This WSA is contiguous to a portion of the Sheldon Antelope Refuge proposed for wilderness designation by the Fish and Wildlife Service. Although not rich in topographic or vegetative diversity, the WSA does support populations of deer, antelope and upland game birds for hunting and viewing opportunities and a number of archaeological sites are also present within the WSA.

Social and Economic Conditions

In some instances, planning unit data will be presented with data for Modoc County. Such regional data will be employed either where insufficient data are available for the planning unit alone or where aggregated data will better portray the character of the study area.

Economic Conditions

Population: The population of Modoc County has been fairly stable, fluctuating around 8,000 people for the last 45 years.

Fluctuations in the county's population prior to 1970 are presumably related to changing market conditions and production methods in the county's basic industries (primarily agriculture and forest products). Consolidation of farm parcels over the past several decades, resulting in fewer, larger-acreage farms, has resulted from cost and price conditions in national agricultural markets, as well as from the replacement of human labor by capital-intensive machinery (Modoc County, 1974). Cycles of economic depression affecting the timber industry have also contributed to depressing the county's population growth (Watanabe, 1975). Both of these trends in the county's basic industries, coupled with the accompanying spillover effects in other economic sectors, have reduced employment opportunities in Modoc County, partially explaining the population figures.

Approximately 1,100 people live within the planning unit in Surprise Valley. As shown in TABLE 2-24, the population in Cedarville, Fort Bidwell, and Lake City is expected to increase at a modest rate. Interviews with valley residents and with county employees suggest that most newcomers to the area are retired people who are less dependent upon local employment conditions than are wage-earners. The attractiveness of the Surprise Valley for older and/or retired people, as well as the lack of employment opportunities for younger people, has resulted in a population heavily skewed towards the older years. According to Modoc County statistics (1977), 28.4 percent of the valley's population is 55 years of age or older, compared to 17.6 percent statewide (U. S. Dept. of Commerce, 1970 census data).

Employment: The dominant role of the basic economic sectors (specifically, agriculture and government employment) in the planning unit's economy is illustrated in TABLE 2-25.

Approximately 62 percent of the Surprise Valley's work force is employed in ranching or in governmental services, far exceeding the 24 percent statewide. The implication for this narrowly based economy is that economic growth, and possible increases in employment opportunities, will come slowly and will almost totally depend on decisions made outside of the region, such as price increases in national livestock markets or government decisions affecting staff sizes in the area.

In summary, the Cowhead/Massacre Planning Unit is situated in an area with little economic diversity which has historically been affected for the most part by external economic conditions. This has resulted in a fairly stable population level, composed of a high proportion of older residents relative to the rest of the State.

Regional Agriculture: Modoc County's agriculture industry is predominately geared towards livestock production, either directly through cattle or sheep ranching or indirectly through forage and feed production (Centaur Management Consultants, 1978).

TABLE 2-24

Projected Estimated Population, Surprise Valley
1970 - 1990

	1970 ^{1/}	1974 ^{2/}	1980	1990
Cedarville		640	665	710
Fort Bidwell		330	340	365
Lake City		105	110	115
TOTAL	943	1,075 ^{3/}	1,115 ^{3/}	1,190 ^{3/}

1/ Modoc County, 1977

2/ Modoc County, 1975

3/ Percent annual change, 1970-74 = 3.5
1974-80 = 0.6
1980-90 = 0.7

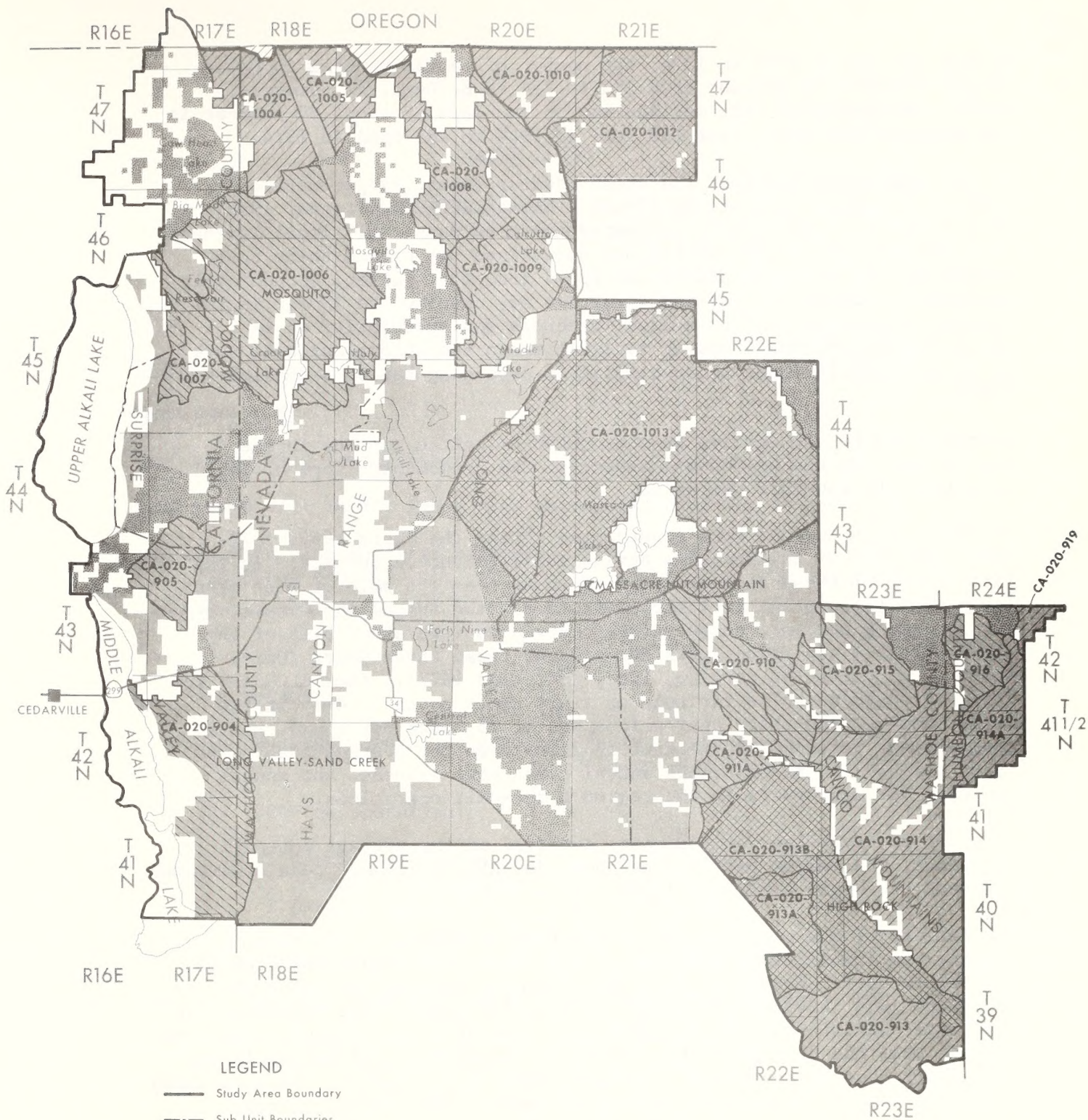
TABLE 2-25

Employment by Industry, Cowhead/Massacre Planning Area^{1/}
(1977)

Sector	Employees	Percent of Total Work Force
Trade and Services	39	12
Health Services	29	9
Finance, Insurance, and Real Estate	7	2
Construction	35	11
Utilities and Transportation	13	4
Education	24	8
Government (local, State, and Federal)	47	15
Agriculture	124	39
TOTALS	318	100

^{1/} Employment estimates were derived from direct and indirect observation and through interviews.

Source: Bureau of Land Management, 1978, Planning Area Analysis, Cowhead/Massacre Planning Unit.



CA-000-000 Unit Number (State-District-Unit)

During the period 1964 to 1974, the number of cattle ranches in Modoc County declined 31 percent from 370 to 254 (U.S. Dept. of Commerce, 1977). Accompanying this decline was an increase of about 80 percent in the average herd size, from 269 head in 1964 to 483 head in 1974.

It has been predicted that the trend towards fewer, larger cattle ranches is likely to continue (Centaur Management Consultants, 1978). This trend will probably be furthered in three ways: (1) local ranchers with the relatively more profitable operations may expand their base properties by acquiring additional lands from the smaller, economically marginal ranchers; (2) outside investors may continue to invest in the region, purchasing land from local ranchers for speculative or tax purposes; and (3) small and/or marginal ranch operations may sell some of their lands in order to specialize in producing hay on a smaller ranch.

Contributing to the decline in the number of cattle ranches in the region has been the uneconomic aspect of the predominant form of local ranching, the cow-calf operation.

Detailed ranch budgets were constructed during the years 1966, 1972, 1977, and 1979 by California's Agricultural Extension Service. In the first three of these studies ranch revenues from the sale of beef were lower than the average variable costs (i.e., the annual cash costs) by 18, 33, and 9 percent, respectively. Revenues were about half of the total variable and fixed costs for each of these three years (Univ. Calif., Ag. Extension Service, 1968, 1972, and 1977). (See GLOSSARY for inputs considered to be variable or fixed ranch costs.) Only in the latest study, with steer beef prices set at 75 cents per pound, was a positive net return of 17 percent realized over the average cash costs (Pierce, 1979). In short, the annual costs have exceeded the annual revenues for many years in the region's cow-calf operations.

In order to cover the various costs involved in the average cow-calf operation, the feeder beef prices shown in TABLE 2-26 have been determined necessary to cover all ranch input costs.

The ability of the region's cattle ranchers to remain in business, despite the inability to cover all ranch costs, has been attributed to several factors. Revenues from other sources, such as hay sales and off-ranch jobs, have bolstered net returns for some of the ranchers. In most cases additional bank financing has been obtained to cover operating costs. This has been possible due to the increasing land values in the area which have increased the ranchers' unmortgaged equity. Some ranchers have undervalued their depreciation and family labor costs, thereby giving them an exaggerated level of net returns (Reed, 1978). And, as will be discussed later in this chapter, there are intangible benefits associated with ranching. These benefits make the ranching lifestyle preferable to all other careers which the ranchers might pursue. The low rate of financial return is thus relatively unimportant. There are also those ranchers who, through economies of scale, efficient use of available resources, and sound management practices, have been able to realize a positive return on their efforts.

TABLE 2-26

Break-Even Feeder Beef Prices
Modoc County

Costs	Price Needed Per Pound ^{1/}
Cash cost only	\$.41
Cash costs plus family labor	.50
Cash costs plus family labor plus depreciation	.75
All of above plus mortgage payments (\$400,000 @ 8.5%)	1.08

^{1/} Assumptions:

- (1) Average weaning weights -- Steers - 400 pounds
Heifers - 375 pounds

- (2) 500-Cow operation:

75 percent calf crop
15 percent replacement
2 percent mortality

Source: Derived from Univ. Calif., Ag. Extension Service, 1977.

TABLE 2-27

IMPORTANCE OF PLANNING UNIT FORAGE ON A REGIONAL BASIS

Region	Number of Cows in the Region	Estimated Total Annual Livestock Sales in the Region	Region's Cows on the Public Range of the Planning Unit During Peak Season of Use (May-July)	Number	Percent	Dollars	Estimated Livestock Sales Due to the Cows on the Public Range of the Plann- ing Unit	Percent of Regional Sales	Dollars	Value of BLM Forage to Regional Livestock Sales ^{a/}	Percent of Regional Sales
Modoc County	51,190	\$11,086,000		8,821	17%	\$1,258,300		11%	\$524,100		5%
Surprise	18,655	\$ 4,491,585		8,671	46%	\$1,236,500		28%	\$515,200		11%
TOTAL pub ^{b/}	N/A	N/A		11,890	N/A	\$1,695,500		N/A	\$706,500		N/A

a/ Based on an average five month grazing season.

b/ Includes non-county permittees.

Source: Modoc County, 1978; Grazing Record Master for 1978.

TABLE 2-28
OPERATOR DEPENDENCY BY MANAGEMENT AREA

% of Herd on This Unit to													
Total Herd													
During BLM													
Season of													
Use2/													
Unit3/													
Overall													
Dependency													
Season													
Dependency													
Magnitude													
of Outside													
Income4/													
Final													
Determination													
of Dependency5/													
Sub-Unit 1													
B. G. Bunyard		1,516	3,248	4%	9,185	100%	17%	100%	Moderate	High	Low	High	
Earp		3,484	8,283	42%	N/A	N/A	N/A	N/A	N/A	N/A	High	N/A	
Sub-Unit 2													
MANAGEMENT AREA A													
E. Hill		722	722	100%	N/A	61%	N/A	61%	N/A	High	Low	High	
J. Parman		723	1,364	53%	5,728	26%	13%	26%	Low	Low	Low	Low	
MANAGEMENT AREA B													
D. Coops		52	1,702	3%	9,080	1%	1%	1%	Low	Low	Low	Low	
C. Marx		240	1,588	15%	6,238	4%	4%	13%	Low	Low	Low	Low	
J. Weber		880	7,076	12%	32,110	3%	3%	5%	Low	Low	Low	Low	
MANAGEMENT AREA C													
C. Marx		1,348	1,588	85%	6,238	75%	22%	75%	Moderate	High	Low	High	
J. Weber		894	7,076	13%	32,100	8%	3%	8%	Low	Low	Low	Low	
MANAGEMENT AREA D													
D. Coops		104	1,702	6%	9,080	3%	1%	3%	Low	Low	Low	Low	
J. Weber		296	7,076	4%	32,110	1%	1%	1%	Low	Low	Low	Low	

TABLE 2-28 (continued)

	AUMs in Unit	Total BLM AUMs	% of Total in Unit	Overall AUMs of Ranch	Overall Dependency of Operator ¹ / on This Unit	% of Herd on This Unit to Total Herd During BLM Season of Use ² / Use ³ / Season of Dependency	Overall Dependency	Unit ² / Season Dependency	Magnitude of Outside Income ⁴ / Income ⁵ / Dependency	Final Determination of Dependency ⁵ / Dependency
MANAGEMENT AREA E										
B. G. Bunyard	645	3,248	20%	9,185	7%	100%	Low	High	Low	High
D. Coops	1,546	1,702	91%	9,080	17%	42%	Moderate	Moderate	Low	Moderate
Earp	4,227	8,283	51%	N/A	N/A	N/A	N/A	N/A	High	N/A
W. & M. Heryford	820	1,100	75%	13,000	6%	41%	Low	Moderate	Low	Moderate
W. Hussa	1,838	1,838	100%	15,752	12%	74%	Low	High	Low	High
J. Weber	5,006	7,076	71%	32,110	16%	32%	Moderate	Moderate	Low	Moderate
Sub-Unit 3										
MANAGEMENT AREA A										
Berryessa	2,178	2,178	100%	16,098	14%	51%	Low	High	Low	High
W. & M. Heryford	280	1,100	25%	13,000	2%	6%	Low	Low	Low	Low
D. Jones	128	392	33%	2,087	6%	18%	Low	Low	Low	Low
Kirkpatrick	226	2,433	9%	N/A	N/A	N/A	N/A	N/A	High	N/A
J. Laxague	854	1,104	77%	15,955	5%	17%	Low	Low	Low	Low
R. Page	138	352	39%	1,922	7%	33%	Low	Moderate	Moderate	Low
J. Parman	641	1,364	47%	5,728	11%	26%	Low	Low	Low	Low
R. Parman	128	128	100%	350	37%	84%	High	High	Moderate	Moderate
D. Steward	392	560	70%	1,970	20%	65%	Moderate	High	Low	High
Warren's Ranch	856	1,548	55%	9,144	9%	51%	Low	High	Low	High
MANAGEMENT AREA B										
B. G. Bunyard	93	3,248	3%	9,185	2%	7%	Low	Low	Low	Low
L & L Cattle Co.	111	3,133	4%	11,813	1%	2%	Low	Low	Moderate	Low
Earp	572	8,283	7%	N/A	N/A	N/A	N/A	N/A	High	N/A
H. Hapgood	496	496	100%	4,705	11%	35%	Low	Moderate	Low	Moderate
N. Hill	2,004	2,004	100%	8,795	23%	92%	Moderate	High	Low	High
D. Jones	264	392	67%	2,087	13%	42%	Low	Moderate	Low	Moderate

TABLE 2-28 (continued)

	AUMs in Unit	Total BLM AUMs	% of Total in Unit	Overall AUMs of Ranch	Overall Dependency of Operator ^{1/} on This Unit	% of Herd on This Unit to Total Herd During BLM Season of Use ^{2/}	Unit ^{3/}		Magnitude of Outside Income ^{4/}	Final Determination of Dependency ^{5/}
							Overall Dependency	Season Dependency		
Sub-Unit 4										
MANAGEMENT AREA A										
Kirkpatrick	2,207	2,433	91%	N/A	N/A	N/A	N/A	N/A	High	N/A
J. Laxague	250	1,104	23%	15,955	2%	4%	Low	Low	Low	Low
R. Page	214	390	55%	1,922	11%	56%	Low	High	Moderate	Moderate
Peterson	150	369	41%	12,300	1%	8%	Low	Low	Low	Low
M. Quirk	560	560	100%	1,930	29%	100%	High	High	Low	High
A. Smith	166	166	100%	5,339	3%	17%	Low	Low	Low	Low
D. Steward	168	560	30%	1,970	9%	34%	Low	Moderate	Low	Moderate
Warren's Ranch	692	1,548	45%	9,144	8%	34%	Low	Moderate	Low	Moderate
Sub-Unit 4										
MANAGEMENT AREA A										
B. G. Bunyard	406	3,248	13%	9,185	4%	21%	Low	Low	Low	Low
Fee Ranch	283	3,371	8%	18,637	2%	7%	Low	Low	Low	Low
Peterson	161	369	44%	12,300	1%	11%	Low	Low	Low	Low
G. & H. Schadler	57	57	100%	3,361	2%	3%	Low	Low	Low	Low
Schadler Ranches	1,214	6,315	19%	17,000	7%	25%	Low	Low	Low	Low
MANAGEMENT AREA B										
R. Bordwell	1,040	1,040	100%	3,798	27%	79%	High	High	Low	High
B. G. Bunyard	588	3,248	18%	9,185	6%	39%	Low	Moderate	Low	Moderate
F. & James Carey ^{6/}	121	121	100%	18,004	2%	8%	Low	Low	Low	Low
P. & John Carey	154	154	100%							
Cockrell's Inc.	177	5,761	3%	19,174	1%	3%	Low	Low	Low	Low
Fee Ranch	3,088	3,371	92%	18,637	17%	44%	Moderate	Moderate	Low	Moderate
H. Harris	895	895	100%	4,299	21%	62%	Moderate	High	Low	High
Peterson	58	369	16%	12,300	1%	6%	Low	Low	Low	Low
L. Sagehorn	93	2,629	4%	12,004	1%	6%	Low	Low	Low	Low

TABLE 2-28 (continued)

	AUMs in Unit	Total BLM AUMs	% of Total in Unit	Overall AUMs of Ranch	Overall Dependency of Operator ^{1/} on This Unit	% of Herd on This Unit to		Unit ^{3/} Overall Dependency	Magnitude of Outside Income ^{4/}	Final Determination of Dependency ^{5/}	
						Total Herd	Season of				
						During BLM Use ^{2/}	Use ^{2/}				
MANAGEMENT AREA C											
Cal-Vada	3,022	3,133	96%	12,398	24%		48%	Moderate	Moderate	Low	
L. Kyte	1,111	1,111	100%	1,960	57%		100%	High	High	High	
L. Sagehorn	2,068	2,629	78%	12,004	17%		52%	Moderate	High	Low	
Schadler Ranches	3,033	3,779	80%	15,248	20%		75%	Moderate	High	High	
Wolfens Feed Lots	1,145	1,145	100%	84,000	1%		4%	Low	Low	Low	

** For all footnotes (0/) refer to APPENDIX G.

Source: BLM, 1978. Centaur Management Consultants, 1978

See APPENDIX G for the derivation of the above table.

Moderating the financial problems plaguing ranchers the past several years are the projections of an upswing in cattle prices lasting through the early 1980s (Lierle, 1978). With some contracted calf prices for feeders being as high as 73 cents per pound, it is clear from TABLE 2-26 that those ranchers having little or no debt payments on money borrowed in the past will be able to cover family labor and depreciation costs. Several years of good returns will improve the equity position of the ranchers, thus giving them more flexibility to adapt to changes than they presently have.

Contribution of BLM Forage: The amount of forage supplied by the public lands of the planning unit is relatively slight on both a planning unit and county basis. The 34 permittees analyzed have an annual forage need of at least 368,000 AUMs. The public lands provide 56,730 AUMs, or 15 percent of this total annual need. The planning unit contributes 4 percent of Modoc County's annual forage needs of 1,499,851 AUMs (Centaur Management Consultants, 1978).

It is possible to estimate the financial contribution of the total 56,730 active AUMs currently provided to Cowhead/Massacre permittees to Modoc County's annual gross livestock sales. Each animal unit (AU) within the county represents 142.60 dollars of the total 11,086,000 dollars livestock sales for 1977 (Modoc County, 1978). The proportion of the regional sales affected directly by the planning unit's forage resources is detailed in TABLE 2-27.

Within the Surprise Valley, about 46 percent of the valley's cows run on the planning unit's lands during the heaviest season of use (May-July). Based on an average of five months of grazing on the public lands, approximately 11 percent (515,200 dollars) of the valley's 4.5 million dollars of beef sales can be attributed to BLM forage.

The regional importance of the planning unit diminishes when a larger area (Modoc County) is considered. Only 17 percent of the county's cow-calf inventory grazes on the planning unit during the heaviest season of use. The contribution of this BLM forage to the county's annual beef sales is about 524,100 dollars, or 5 percent of the 11,086,000 dollars registered in 1977.

In summary, the forage provided by the planning unit is important to the livestock operators of the Surprise Valley, up to 40 percent of the valley's cows and calves are on the public lands during at least part of the grazing season.

Operator Dependency by Management Area: Estimates of the extent to which operators depend on the forage supplied by each of the management areas and sub-units in the planning area are provided in TABLE 2-28. Many of the operators utilize forage in several of the management units. Therefore their overall dependency on BLM may be greater than shown for any particular management area. In addition it should be noted that all but three of the operators (Earp, Kirkpatrick, and Wolfsen's Feed Lots) have low or moderate sources of outside income.

The different management areas are ranked below (TABLE 2-29) with respect to their relative importance to the ranching community. The rankings are based upon the number of ranchers running livestock in the area and the dependency of the ranchers (as determined in TABLE 2-28) upon the area. Values of "1," "2," and "3," were assigned to the dependency categories of "low," "moderate," and "high," respectively.

Under the chosen criteria for ranking the areas, their relative importance is explained primarily by the number of ranchers operating within each area. Thus, Management Area 3B, with 14 ranchers dependent on its forage, shows the greatest cumulative dependency. Area 2D, with only two ranchers with "low" dependency, is least important.

Social Conditions

Most of the operators are part of the Surprise Valley community. The exceptions are: Kyte, Kirkpatrick, Earp, Wolfsen's Feed Lots, and Schadler Ranch. These operators affect the Surprise Valley community by providing some seasonal employment, and in some cases by employing full-time ranch managers who live in the community.

There appears to be a common identification with the livestock industry by both ranchers and non-ranchers. Several businessmen and county employees felt that the economic and social viability of Surprise Valley depends upon the continuance of locally owned family ranches, which currently comprise 95 percent of the permittees analyzed in the Operator Dependency Analysis (Centaur Management Consultants, 1978). Empirical studies tend to substantiate this belief: (1) significantly higher levels of personal involvement in formal and informal social interactions and in local political activity have been found in family farmers than in salaried workers on corporately owned farms (Heffernan, 1972); (2) a frequently cited study done in the 1940s compared the two central California towns of Arvin, which is surrounded by large-scale farms, and Dinuba, which was then characterized as a small, family-farm community. In proportion to the two towns' populations, Dinuba had twice the number of businesses and white-collar and professional workers, three times the number of farm operators, slightly more skilled, semi-skilled, and service employees, and less than half the number of salaried and/or seasonal farm laborers than Arvin. Dinuba supported more people in the local community per dollar of agricultural output, at a higher standard of living, than did the large-scale farming area of Arvin (U. S. Congress, 1946).

Attitudes of several Surprise Valley residents reflect an awareness of these values deriving from family-sized ranches. Dissatisfaction was often expressed with the trend towards consolidation of ranch parcels, with outside investment, and with the accompanying decline in the number of ranch families living in the valley. Many people believe that such consolidations impose a social cost on the community by reducing the number of social interactions with other ranch families and by causing reductions in the number of local stores and schools. However, the

TABLE 2-29

Economic Importance of Management Areas Ranked by Rancher Dependency

Rank	Management Area	No. of Ranchers In Management Area	Number of Rancher in Each Dependency Category ^{1/}			Raw Score ^{2/}
			Low	Moderate	High	
1	3B	14	5	5	2	21
2	3A	10	5	1	3	16
3	4B	9	4	2	2	14
4	2E	6	-	3	2	12
5	4C	6	2	-	3	11
6	4A	6	6	-	-	6
7	2A	2	1	-	1	4
	2C	2	1	-	1	4
9	1	2	-	-	1	3
10	2B	3	3	-	-	3
11	2D	2	2	-	-	2

1/ Dependency category values: Low = 1 Moderate = 2 High = 3 Since data was not available for all of the ranchers, these numbers do not always match the total number of ranchers in that management area.

2/ Raw scores were calculated by multiplying the number of ranchers in each dependency category by the given value of each category (see footnote 1, above). The results derived for each dependency category in each management area were then added for the total raw score. For example, the raw score for Area 3B was derived:

$$(5 \times 1) + (5 \times 2) + (2 \times 3) = 21$$

economic advantages of busing children to the valley's two centralized schools and the ease of driving to Lakeview for groceries and other household goods probably play a more significant role than ranch consolidation in the decrease in numbers of local stores and schools, especially since the valley's population has not been decreasing.

Area ranchers appear to hold several attitudes common among ranchers in other parts of the Western States. It has been argued that ranching is more than a livelihood, that it is a lifestyle with psychological returns, often of higher value than economic profit (Smith and Martin, 1972). Rather than staying in business for the currently low net returns to capital and labor, which range from negative values up to about 3 percent (O'Brien, 1977), ranchers tend to follow models of economic satisficing. This means that ranchers are willing to settle for less than the maximum return that they might receive if they directed their efforts to other endeavors. They appear to be satisfied with the present mixture of monetary and non-monetary benefits received.

This is not meant to imply that monetary profits are unimportant to Surprise Valley ranchers. Rather, this approach helps to explain the perceived benefits from living in a ranching community expressed by both ranchers and non-ranchers. The predominate attribute mentioned by almost all of those interviewed was the rural nature of the valley. High values are placed on the existing social milieu, including the slow pace of life, the friendliness of local people, the familial ties binding perhaps one-third of the residents, and the absence of congestion and other problems which plague urban and suburban areas.

The general sentiments of the residents are conservative: "We do have problems, but we like our valley, and don't want to see it change."

CHAPTER 3

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

Chapter 3

IMPACTS OF THE PROPOSED ACTION

INTRODUCTION

Those resources which would receive the most significant impacts are soils, vegetation, wildlife, wild horses, cultural resources, and social and economic conditions. This chapter first summarizes anticipated impacts throughout the planning unit for both the short (5 years) and long (20 years) terms. Included in this summary is a brief description of impact assessment techniques and their reliability used for each resource component. Following the summary is a more detailed analysis by sub-unit of the anticipated impacts (MAP 3-1).

Because of the difficulties inherent in assessing site-specific impacts on soil and water resources, these impacts are described in the general summary only for the entire study area.

Several basic assumptions were made when environmental impacts of the proposed management were analyzed:

- (1) Manpower and capital would be available to implement and monitor the management programs.
- (2) All necessary wild horse reductions would be made before full implementation of management systems.
- (3) Impacts would be monitored and management adjusted as necessary based on increased data availability.
- (4) Livestock operators would be willing and able to manage livestock more intensively on public lands.
- (5) Forage utilization targets would be adhered to.

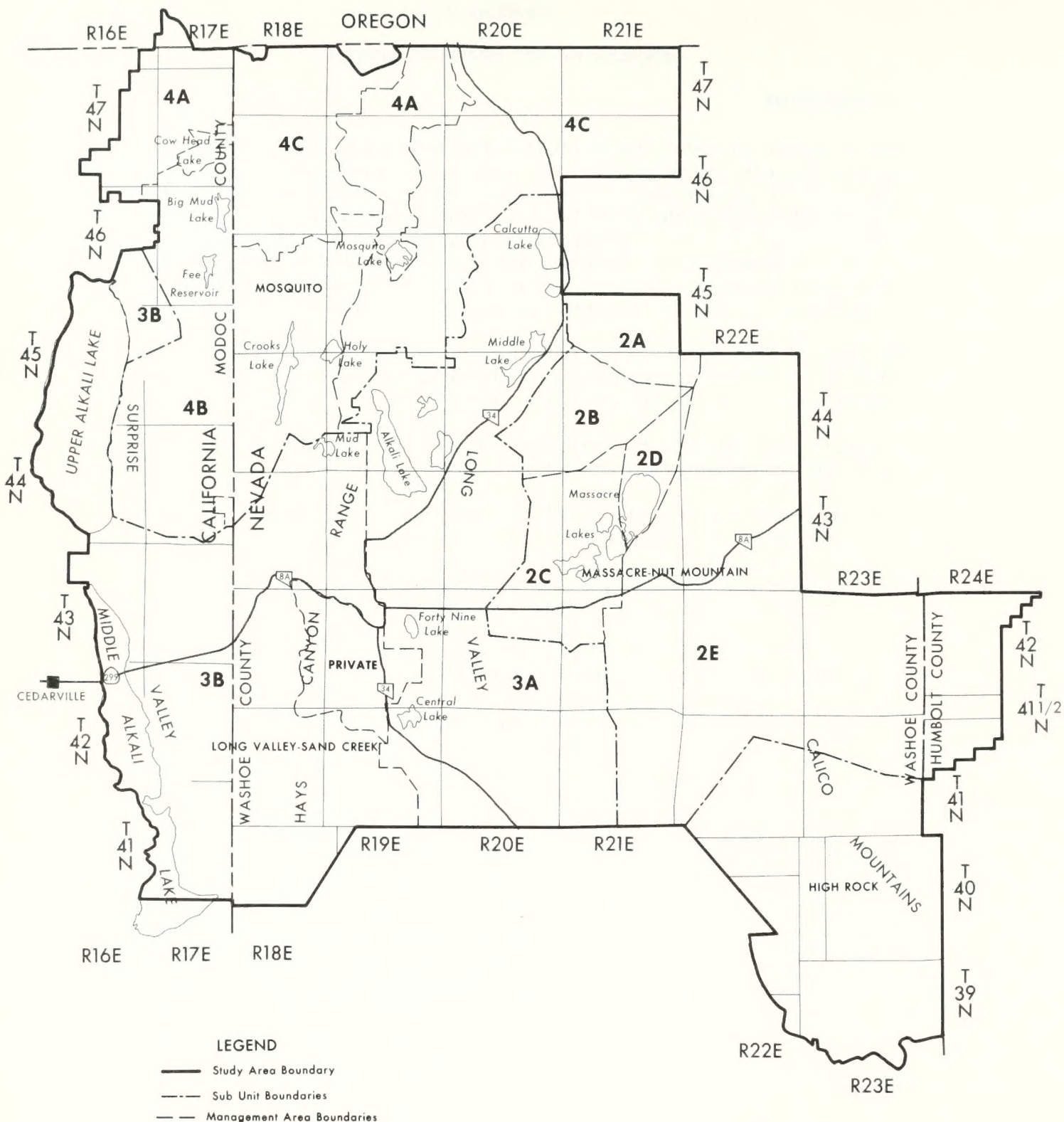
Limitations on impact assessment occur where lack of available long-term data and detailed scientific data preclude an extensive analysis. This is particularly true for vegetation, wildlife, and cultural resources. Knowledge of the area and professional judgment, based on observation and analysis of similar conditions and responses in similar areas, has been used to infer environmental impacts where data limitations occur.

GENERAL SUMMARY OF IMPACTS

Impacts on Soil and Water

Impact Assessment Techniques and Reliability

The Cowhead/Massacre Planning Unit lies in a zone of fall and winter precipitation. Because of fairly uniform, low-intensity rain storms and slow snow melt, water erosion tends to be proportional to annual rainfall. This, coupled with the Pacific Southwest Inter-Agency Committee (PSIAC) approach for estimating erosion, permits calculations of an average sediment load for runoff.



Experimental data, referred to below, have been compared to the estimated rates of erosion and suspended loads. Impacts of the proposed action on ground-water recharge and streamflow are more difficult to estimate. However, experimental evidence exists to support the conclusion that runoff and soil erosion increase with decreased cover. Experiments also indicate that the replacement of brush cover by grass cover is a water-conservation measure. Such action should lead to greater ground water-recharge and more available surface and ground water.

Soil Erosion

The ability of plant cover and soil mantle to dispose of precipitation determines, to a large extent, the degree of soil stability within a watershed. Thus, a prediction of the condition trend for a particular ecological site following implementation of the proposal would offer a basis for estimating the resulting impacts on soil erosion.

Ecological sites can be divided into three general categories: (1) those that are generally dry and produce less than 500 pounds of forage per acre annually--in general, such sites will not rapidly produce 60 percent of ground cover shown to be necessary for erosion stability (Meeuwig, 1970); (2) an intermediate group which produces up to 1000 pounds of forage per acre; and (3) more favorable sites which produce well over half a ton of forage per acre annually.

Projected range conditions 20 years hence under the proposed management, by ecological site and action projections, are given in TABLE 3-4 in the vegetation section. By considering the most probable predicted range condition 20 years hence, along with the estimated present canopy cover and ground cover (shown graphically for climax and present condition in APPENDIX C), it is possible to estimate the most probable future (20 years) ground cover and canopy cover. This, then, allows a prediction of soil erosion and an estimate of the quality of runoff (for example, see APPENDICES H, I)(PSIAC, 1968).

The basic data on percent bare ground and percent canopy cover on each ecological site were taken at climax and present condition. Range condition was plotted along the horizontal axis. The following ground covers were assumed: "excellent" or "climax" range was from 100-75 percent, "good" range was from 75-50 percent, "fair" range was from 50-25 percent, and "poor" range was from 25-0 percent.

Knowing the total acreage of each ecological site in each sub-unit allows an estimate of total tonnage of soil lost for each sub-unit for the present and 20 years hence under the proposed action as shown in TABLE 3-1.

TABLE 3-1

Comparison of Present and Future (20 Year)
Erosion Rates (Tons/Ac./Yr.)

<u>Sub-Unit</u>	<u>Present Erosion</u>	<u>Projected Erosion 20 Years Hence</u>
1	0.9	0.6
2	1.3	0.6
3	1.1	0.6
4	1.3	0.7

Estimated present and projected (20 year) soil erosion losses by sub-unit are shown in TABLE 3-1, and by management area in TABLE 3-2. Implementation of the proposed action would reduce the estimated erosion from 30 to 60 percent of estimated present rates. The marked reduction in erosion would result from returning more residues and more vegetative cover. This protective vegetative cover, both mulch and standing crop, in addition to keeping livestock off certain areas, would result in reduced erosion (Lusby, 1970). Apparently livestock trampling detaches soil particles, thus promoting erosion. Other studies support the determination that degree or intensity of grazing was a major consideration in producing runoff (Rauzi and Hanson, 1966).

Water Quality

Impacts of grazing on water quality are associated with amount, duration and timing of erosion, sedimentation, and runoff. All of these factors are associated with vegetative cover. Because of the large area occupied by rangeland in the study area, its contribution to total sediment load (suspended and bedload) in streams is great. Excessive removal of cover associated with overgrazing accentuates sediment yield potential from rangelands.

Ground-water quality, as well as surface-water quality, is greatly impacted by the amount of interflow, water which infiltrates into the ground and moves to a stream channel through the soil zone. Although travel time for interflow is longer than for surface runoff, interflow can contribute a larger portion to channel flow than surface runoff, particularly following a storm of moderate intensity.

As noted earlier, the proposed action would be expected to result in an improvement in most ecological sites. This improvement would include a reduction of percent bare ground for each site and, concomitantly, a buildup in plant litter, thus decreasing surface runoff and sediment load. Likewise, ground-water recharge, and therefore interflow, should increase. These effects on surface runoff and interflow would result in an improvement in water quality through a reduction in sediment and temperature.

TABLE 3-3 shows, by management area, the expected percent reduction of suspended matter in runoff water over 20 years. These reductions range from 30-54 percent. The calculations are based on certain assumptions explained in APPENDIX I. A recently published comparative study by Schreiber and Renard (1978) of two small drainage basins, one heavily grazed and one not grazed, supports these estimates. In their study, the heavily grazed area produced suspended solids up to 4,000 milligrams per liter while the small basin receiving no grazing produced only about 1,000 milligrams per liter of sediment. The values for suspended loads from grazed areas are within our calculated limits--the reductions reported for non-grazed areas are considerably greater.

TABLE 3-2

Estimated Soil Loss
(Tons/Acre/Year)

Management Areas	Proposed Treatment	Present Loss	Loss Projected (20 Years After Implementation)	Explanation
1	No grazing	.90	.6	Poorly vegetated rocky soil, slight erosion hazard
2A	Graze 1 year out of 3	.95	.7	Range condition from fair to good on sandy soil
2B	Prescribed grazing	1.40	.7	High initial erosion rate--marked improvement
2C	Graze 2 years out of 4	1.40	.6	High initial erosion rate--marked improvement
2D	No grazing	1.05	.6	Poorly vegetated shallow soil, slight erosion hazard
2E	Graze 2 years out of 4	1.40	.6	High initial erosion rate--marked improvement
3A	Graze 2 years out of 4	1.30	.7	Moderate initial erosion, slow improvement
3B	Fall/winter use	.95	.6	Relatively low rate of initial erosion--limited later improvement
4A	Lands managed in association with private lands	1.10	.6	Slight erosion hazard--marked improvement
4B	Graze 2 pastures out of 3 per year	1.30	.7	High to moderate erosion--marked improvement
4C	Graze 2 out of 4 pastures per year	1.30	.6	Low to moderate erosion rate--marked improvement

TABLE 3-3

Suspended Sediment in Runoff Water
(mg/l)

Management Areas	Treatment	Initial Suspended Sediment	Anticipated Suspended Sediment After 20 Years	Percent Sediment Reduction
1	No Grazing	6,437	4,304	33
2A	Graze 1 year out of 3	7,174	5,021	30
2B	Prescribed Grazing	10,044	5,021	50
2C	Graze 2 years out of 4	10,044	4,304	57
2D	No Grazing	7,891	4,304	45
2E	Graze 2 years out of 4	10,044	4,304	57
3A	Graze 2 years out of 4	9,326	5,021	46
3B	Fall/Winter Use	6,437	4,304	33
4A	Custodial	7,891	4,304	45
4B	Graze 2 pastures out of 3 per year	9,326	5,021	46
4C	Graze 2 out of 4 pastures	9,326	4,304	54

The proposed action, by increasing grass cover and subdividing surface flows, would tend to reduce early channelization of runoff, thus preventing erosion of the soil surface as well as channel cutting. This decrease in erosion would also help decrease stream temperature. The frequency of low peak flows would be reduced by 50 percent, increasing stream-channel stability and quality of the aquatic environment.

Fencing 5 miles of Sand Creek, 3 miles of Coleman Creek, and 1 mile of Twelve Mile Creek would reduce the sediment flowing through these streams by 80 percent during the higher flows and 50 percent during the lower flows (Winegar, 1977).

In summary, the proposed action would result in a 50-percent decrease in erosion, from 1.2 tons per acre to 0.6 tons per acre. There would be a proportionate decrease in sediment and silt in surface waters. Within the projected 20-year period surface runoff would decrease during storms and snow melt. Ground-water storage and flow would increase.

Impacts on Vegetation

Impact Assessment Techniques and Reliability

Analysis of impacts on vegetation is based on the premise that the species composition of ecological sites would move toward climax conditions if the physiological requirements for plant growth and reproduction are satisfied. If basic plant requirements are not satisfied, trend toward climax conditions would not be anticipated.

The degree or rate of vegetative change depends upon the favorability of growing conditions (i.e., temperature, available soil moisture, etc.), the current abundance and composition of plant species, and the degree to which grazing management proposals satisfy plant requirements.

The growth requirements of individual plant species and their response to various grazing intensities, periods of use, periodic rest, or deferment of grazing were determined through analysis of research studies and observations of similar grazing systems. Since specific studies have not been conducted on the study area or on nearly identical sites, it was necessary to make indirect comparisons of cause and effect relationships with studies conducted elsewhere.

Due to the extremely complex and dynamic nature of rangeland ecosystems, there are numerous differences between the study area and areas in which grazing systems or research studies have been conducted. Results of these studies and grazing systems conducted under supposedly similar situations are often contradictory. Thus, it was often necessary to analyze all sources of information and make our best professional judgment relating to the study area.

Although every effort was made to accurately predict vegetative response, there would invariably be instances where anticipated results would not occur. The monitoring system has been designed to assess the response of management systems. If management goals are not being achieved, adjustments in management would be required.

Vegetative Condition and Trend

Predicted changes in vegetation are based on data on present range condition and trend, presence and abundance of forage species, soil moisture relations of each ecological site, and type of grazing management proposed. The anticipated response of each ecological site under the various management proposals is discussed in APPENDIX J. Vegetation generally recovers faster under systems which provide more rest during the growing season and more opportunity for reproduction and seedling establishment. Thus vegetation in areas under proposed grazing systems which provide for the plants' physiologic needs by limiting livestock use and providing more deferment (e.g., Management Areas 2A, 2C, etc.) would improve most appreciably. Additionally, greater amounts of vegetation would be available for other uses.

The overall impacts of the proposed grazing management will be beneficial. Improvement will occur as a result of utilization levels being reduced and by implementing grazing management systems. The proposed grazing management systems are designed to satisfy plant growth requirements by providing periodic rest during the growing season. Resting an area after grazing allows: (1) plants opportunity to make and store food, to recover vigor; (2) seed to ripen; (3) litter to accumulate between plants and; (4) seedlings to become established.

Although rest rotation grazing is designed to provide for the establishment of new plants, most evaluations of rotation grazing point out that establishment of new plants does not commonly occur (Hyder and Bement, 1972; Ratliff and Reppert, 1974; Hyder and Sawyer, 1951; Plummer et al, 1978). Establishment of new plants is generally restricted to periods of favorable moisture and with bitterbrush Plummer et al (1978) estimates that one in twenty years is a reasonable estimate of successful establishment of bitterbrush plants. Thus rest rotation systems cannot be expected to provide for significant increases in the numbers of desirable perennial plant species. The grazing systems primary function should be to allow for vigor recovery and to allow litter to accumulate between plants. Deferred grazing would allow both conditions to be met.

The proposal also utilizes utilization restrictions which will insure that forage remains for watershed protection, wildlife needs and other multiple use values. Because of livestock's selective grazing habits, moderate or light use will not be obtained on all plants. Palatability of plant species vary and some plants will be grazed heavier than others. Livestock also tend to graze the same plants repeatedly and closely year after year under continuous grazing. They also tend to graze a greater variety of plants repeatedly and closely around water sources and easily accessible areas (Dyksterhuis, 1949; Hickey and Garcia, 1964; Hormay, 1956).

It is important to assess the adequacy of rest during the growing season treatments since invariably some plants will be completely grazed (Hormay, 1970).

Hormay stated that usually one or two years of rest during the growing season is adequate. Mueggler (1975), however, found distinctive differences in the recovery of Idaho fescue and bluebunch wheatgrass. At low levels of competition both Idaho fescue and bluebunch wheatgrass recovered all vigor within one year after heavy clipping. At increasing levels of competition, however, the recovery period for bluebunch wheatgrass greatly exceeded that for Idaho fescue. The present condition of sites in the study area would be similar to Mueggler's low competition sites. Trlica et al. (1977) recently reported that 14 to 26 months of rest during the growing season were adequate for recovery of vigor in heavily defoliated plants of western wheatgrass, little rabbitbrush, and scarlet globemallow, but not adequate for antelope bitterbrush and fourwing saltbrush.

The amount of rest during the growing season required should be expected to vary with species, location, climatic factors, and history of recent use; however, certain generalizations appear evident. Two years of rest during the growing season following one year of heavy use appears adequate for most grasses and perennial forbs. Plants of low vigor and certain woody perennials may require a longer period of deferment. Plants utilized lightly or moderately may require one growing seasons rest.

Grazing management systems with similar grazing and rest treatments have been successfully implemented on nearby allotments containing similar climate, soils, and vegetative characteristics. Grazing systems that appear most comparable include the Wall Canyon and Nelson Corral Allotments within the Susanville District, the Pueblo Mountain and Goldbanks Allotments in the Winnemucca District, and the Gravelly, Hill Camp, Hickey and Lame Allotments in the Lakeview District.

The Wall Canyon Allotment is located 10 miles south of the study area. For several years the allotment was grazed under a three pasture deferred rotation system. In 1977 a phase-in to a three pasture rest-rotation system was started and in 1978 one pasture will be rested fully, completing the implementation. The evidence of impacts is largely empirical on this allotment, but visual observations reveal improvement in all plant species with substantial improvement on mountain mahogany.

The Nelson Corral Allotment is located 50 miles west of the study area. It was grazed under a two pasture deferred grazing system from 1969 to 1972. A fire on the allotment in 1973, which burned one-third of the area, required modification of the grazing system to provide two years rest to the burn. A four pasture rest-rotation grazing system in which three of four pastures are grazed annually has been applied since the fire. One complete cycle has been completed to date. Utilization on the allotment has dropped from 65 percent in 1969 to less than 30 percent

in 1977 with actual livestock use increasing slightly. The trend index (a summary of the composition of key species, percent cover of live vegetation, number of key species seedlings, and percent litter) has gone from 100 percent in 1969 to 80 percent in 1972, 90 percent in 1974, and to 104 percent in 1976. Evaluation of 1978 trend data indicates a continued upward trend.

The Goldbanks and Pueblo Mountain Allotments have been grazed under a three pasture rest-rotation grazing systems since 1974. Evaluation of data gathered following one cycle indicates that there is an increase in sandberg bluegrass, squirreltail, Idaho fescue, bluebunch wheatgrass and Thurber needlegrass on the Pueblo Mountain Allotment. There is an increase in Sandberg bluegrass and squirreltail on the Goldbanks Allotment. It appears that forb diversity and abundance have increased and that bare ground has decreased and vegetative cover has increased.

The Gravelly Allotment is located in Oregon just north of the study area including some land in Nevada. A three pasture system has been in effect for nine years. In earlier years, two pastures were rested alternately and one was deferred. In later years it was modified to a three pasture rest-rotation system. No trend index has been measured or calculated, but all photo stations and annual evaluation write-ups show marked improvement.

The Hill Camp Allotment is also located in Oregon just north of the study area. It has been grazed under a four pasture rest-rotation grazing system with one growing season treatment, two seedripe treatments, and one rest treatment. It has only two photo trend plots - one had trend index increase of 10 percent, the other had trend index decrease of 10 percent. The decrease plot was found to be located on a site where the soil was so deteriorated that it was still best suited for tap rooted species, thus, sagebrush reinvaded after spray treatment. The allotment has a multitude of photo stations and all stations as well as annual evaluation write-ups show stability or marked improvement. The allotment is frequently toured and visited by all interest groups and has received widespread approval and endorsement.

The Hickey Allotment is located in Oregon just north of the study area. It has been grazed with a three pasture rest-rotation system. The allotment has five photo trend plots. The trend index is up from 4 to 44 percent on four of the plots and down 4 percent on one plot.

The Lame Allotment is located in Oregon just north of the study area. It has been grazed under a four pasture rest-rotation system using three out of the four pastures each year (two early treatments, one seedripe treatment, and one rest treatment). The allotment has eight photo trend plots with trend index up on four, static on three, and down on one. Utilization levels have been below target level except for last year. Average utilization level is 32 percent for four years. The Oregon Fish and Game Commission has agreed with evaluations and approved an increase in livestock use.

Based on the response indicated by these previously implemented grazing systems and an evaluation of the degree to which proposed systems satisfy plant growth requirements it is anticipated that significant improvement in range condition would occur on most of the study area within 20 years. Improvement would be most evident on the wetter sites. The driest ecological sites would show only slight improvement.

Expected vegetative condition of ecological sites in 20 years is shown in TABLE 3-4. Average range conditions are predicted to improve. TABLE 3-5 shows the number of acres anticipated in each condition category after 20 years. Acreage in "poor" condition would decrease from 403,000 to 33,000; acreage in "fair" condition would decrease from 437,000 to 321,000; acreage in "good" condition would increase from 6,000 to 442,000; acreage in "excellent" condition would increase from 0 to 500. The condition of 49,000 acres, located in Management Area 4A, cannot be predicted since management systems are not proposed for this area.

Construction and development of fences and additional water facilities would disturb approximately 270 acres (TABLE 3-6). Vegetation would be adversely affected for 5-10 years but would be expected to recover adequately within 20 years.

Fences and water sources would result in a more even distribution of livestock grazing pressure, thereby alleviating some of the pressure on existing concentration areas. However, the proposed water sources would serve as new concentration areas for livestock. Forage species in the vicinity of the proposed water sources would be heavily utilized during livestock grazing periods and trampling effects would be more severe. Most species would be expected to recover vigor during the rest periods provided by the proposed grazing management systems.

Seedings would convert approximately 21,000 acres of dense sagebrush to crested wheatgrass and other introduced species. The continuous spring and summer use proposed for the seedings would cause a downward trend. Sharp (1970) reported similar trends on seedings grazed annually during the growing season.

Vegetative Production

The vegetative production on the study area is expected to increase as grazing management systems are implemented. Studies conducted by Hormay (1970) on a rest rotation grazing allotment near the study area indicate that by delaying turnout dates or by deferring use of an area until early summer or until seedripeness, the total forage production increases significantly.

By adjusting for local climatic differences it is estimated that by delaying turnout dates on pastures the following increased forage production over present levels can be expected: May 1 - 17 percent increase; May 15 - 23 percent increase; June 15 - 28 percent increase; July 15, seedripeness date or complete rest - 28 percent increase.

TABLE 3-4

VEGETATIVE CONDITION IN 20 YEARS WITH THE PROPOSED ACTION

Site #	Acres	Ecological Site	Present Condition	A R E A A F F E C T E D											
				Exclosures		Area									
				Sub-Unit 1	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area
				2-D	2-A	2-B	2-C	3-A	4-C	2-E	3-B	4-B	4-A		
1	20,000	Shadscale/Indian Ricegrass	Poor	Poor	N/A	N/A	Poor	Poor	N/A	N/A	Poor	Poor	N/A		
2	41,000	Greasewood/Basin Wildrye	Poor	Poor	N/A	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Unknown		
3	10,000	Greasewood-Rabbitbrush/ Basin Wildrye	Poor*	Poor	N/A	N/A	Poor	Poor	N/A	N/A	Poor	Poor	N/A		
4	184,000	Low Sage/Sandberg Bluegrass	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Good	Unknown		
5	138,000	Low Sage/Bluebunch Wheatgrass	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Good	Unknown		
6	12,000	Low Sage/Idaho Fescue	Fair*	Good	N/A	N/A	Good	Good	Good	Good	N/A	Good	Unknown		
7	45,000	Juniper-Low Sage/Idaho Fescue	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Unknown		
8	61,000	Big Sage/Bluebunch Wheatgrass- Indian Ricegrass	Fair	Fair	Fair	N/A	Fair	Fair	Fair	Fair	Fair	Fair	Unknown		
9	92,000	Big Sage/Bluebunch Wheatgrass	Poor	Fair	N/A	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Unknown		
10	2,000	Big Sage/Idaho Fescue	Fair*	Good	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Unknown		
11	85,500	Big Sage/Basin Wildrye	Poor	Poor	N/A	N/A	Fair	Fair	Fair	Fair	Fair	Fair	Unknown		
12	32,500	Juniper-Big Sage/Bluebunch Wheatgrass	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Good	Unknown		
13	113,500	Bitterbrush/Idaho Fescue	Poor	Good	Good	Good	Good	Good	Good	Good	Good	Fair	Unknown		
14	500	Mountain Mahogany/Western Needlegrass	Fair*	Good	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Unknown		
15	4,000	Silver Sage/Mat Muhly	Poor*	Fair	N/A	Fair	Fair	Fair	Fair	N/A	Fair	Fair	Unknown		
16	2,000	Baltic Rush	Fair*	Good	N/A	Good	Good	Good	Good	N/A	Fair	Good	Unknown		
17	1,000	Aspen/Slender Wheatgrass	Poor	Good	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Unknown		
18	500	Tufted Hairgrass-Bluegrass	Poor	Excellent	Good	Excellent	Good	Good	Good	Good	Good	Good	Unknown		
19	2,500	Willow/Tufted Hairgrass- Bluegrass	Poor	Excellent	N/A	N/A	Fair	Fair	Fair	Fair	Fair	Fair	Unknown		
Misc.	91,000												Unknown		

* Estimated Condition -- These sites were not sampled during 1977.

TABLE 3-5

TWENTY YEAR CHANGE IN RANGE CONDITION WITH THE PROPOSED ACTION

	Poor (Acres)		Fair (Acres)		Good (Acres)		Excellent (Acres)		Miscellaneous Acres ^{1/}
	Present	20 Year	Present	20 Year	Present	20 Year	Present	20 Year	
SUB-UNIT 1	10,734	1,703	66,732	14,606	0	60,677	0	480	11,554
SUB-UNIT 2									
Area A	7,125	0	9,800	1,400	0	15,525	0	0	475
Area B	3,721	0	18,496	3,396	0	18,796	0	25	403
Area C	10,223	400	16,917	11,685	5,657	20,712	0	0	1,853
Area D	5,352	3,314	915	2,038	0	915	0	0	1,793
Area E	41,777	0	138,114	50,314	0	129,577	0	0	5,574
Total	68,198	3,714	184,242	68,833	5,657	185,525	0	25	10,098
SUB-UNIT 3									
Area A	69,194	17,534	38,440	47,869	0	42,231	0	0	33,530
Area B	119,583	7,358	19,730	118,580	0	13,375	0	0	19,687
Total	188,777	24,892	58,170	166,449	0	55,606	0	0	53,217
SUB-UNIT 4									
Area A	39,440	Unknown	9,256	Unknown	0	Unknown	0	0	3,030
Area B ^{2/}	40,099	3,102	44,834	43,475	0	38,356	0	0	9,870
Area C	55,418	0	74,036	27,212	0	102,242	0	0	3,238
Total	134,957	3,102	128,126	70,687	0	140,598	0	0	16,138
STUDY AREA TOTAL	402,666	33,411	437,270	320,575	5,657	442,406	0	505	91,007

^{1/} These acreages are generally unsuitable for livestock grazing, are not presently significantly affected by livestock grazing, and are not anticipated to change in condition in 20 years.

^{2/} These acres (48,696) are located in less intensive management areas and vegetative condition in 20 years is unknown.

TABLE 3-6

Vegetation Disturbed through Construction of
Water Facilities and Fences

<u>Project</u>	<u>Total Units</u>	<u>Area Disturbed Per Unit During Construction</u>	<u>Total Area Disturbed</u>	
			<u>Acres</u>	<u>Miles</u>
Springs	65	1/3 ac.	22	
Reservoirs	54	2 ac.	108	
Wells	47	1/3 ac.	16	
New Fence	111 mi.	1 ac. mi.	111 ac.	111
Fence Removal	11 mi.	1 ac. mi.	<u>11 ac.</u>	<u>11</u>
TOTAL			268	122

Considering the estimated present forage production under present management (Chapter 2) and using the above projected increases in production by delaying turnout dates, providing deferment and by completely resting some pastures the estimated production of the study area under full implementation of the proposal is approximately 66,000 AUMs (TABLE 3-7).

As range conditions improve, it is anticipated that livestock forage production will increase. The amount of increased production over a 20 year period was determined by applying the percentage increase determined using Anderson's stocking rate guides to the initial livestock forage production. For example: using actual use and utilization studies conducted under the present management situation and by applying production increases for deferment or rest, the initial production of an allotment is 100 AUMs. Following 20 years of management, the condition class of three range sites is estimated to improve from fair to good. Using the stocking rate guides for these sites, it is estimated that the capacity of the allotment will increase by 50 percent. Therefore, the livestock forage production in 20 years is estimated to be 150 AUMs (100 AUMs plus 50 percent increase). Using the above procedures, the livestock forage production for the study area in 20 years will be approximately 185,000 AUMs (TABLE 3-8). It must be realized that approximately half of this production will not be utilized by livestock because of total livestock exclusion in some areas, restrictions on utilization levels in some areas, and a percentage of some areas receive complete rest on an annual basis.

The forage production of the 21,000 acres to be seeded in management areas 3A and 3B will initially be approximately 5,200 AUMs. The production of the seedings was determined by assessing the capacity of seedings in the Massacre Lake AMP and the capacity of a seeding in the Wall Canyon AMP which is immediately south of the study area. The seedings in both of these areas were established on similar soils using similar techniques and have had actual grazing for 5 to 10 years. The anticipated downward trend of seedings resulting from annual grazing during the growing season, is expected to reduce the production of the seedings to approximately 2,600 AUMs over a 20 year period.

Threatened and Endangered Plant Species

The proposed action as it pertains to Sub-Unit 4, Mosquito could possibly have adverse impacts upon Galium glabrescens ssp. modocense and Cordylanthus capitatus which both occur in Management Area A. Since these listed species were recently discovered in this area, the effects of livestock grazing, utilization, and season of use, and any changes to existing grazing methods are not totally known. The fact that the species are present indicates that impacts from grazing have been moderate to none although impacts cannot be judged specifically since the population dynamics of these two plants are not known.

TABLE 3-7

Initial Forage Production with the Proposed Action

<u>AREA</u>	<u>AUMs</u>
<u>Sub-Unit 1</u>	7,710
<u>Sub-Unit 2</u>	
Management Area A	1,595
Management Area B	1,445
Management Area C	1,999
Management Area D	556
Management Area E	<u>15,032</u>
TOTAL	20,627
<u>Sub-Unit 3</u>	
Management Area A	8,467
Management Area B	<u>11,051</u>
TOTAL	19,518 ^{1/}
<u>Sub-Unit 4</u>	
Management Area A	2,121
Management Area B	8,159
Management Area C	<u>16,447</u>
TOTAL	26,757
STUDY AREA TOTAL	74,612

^{1/} Includes 2,500 AUMs for production of seeded area in 3A and 2,700 AUMs for production of seeded area in 3B.

TABLE 3-8

Forage Production in 20 Years with the Proposed Action

<u>AREA</u>	<u>AUMs</u>
<u>Sub-Unit 1</u>	15,232
<u>Sub-Unit 2</u>	
Management Area A	5,552
Management Area B	4,263
Management Area C	6,062
Management Area D	997
Management Area E	<u>42,540</u>
TOTAL	59,414
<u>Sub-Unit 3</u>	
Management Area A	16,481
Management Area B	<u>27,690</u>
TOTAL	44,171 ^{1/}
<u>Sub-Unit 4</u>	
Management Area A	2,121
Management Area B	19,585
Management Area C	<u>45,151</u>
TOTAL	66,857
STUDY AREA TOTAL	185,674

^{1/} Includes 1,250 AUMs for production of proposed seeding area in 3A and 1,350 AUMs for the production of seeded area in 3B.

The proposed action will not impact the location of threatened and endangered plants known to occur within 5 miles of the study area. The study area is fenced so proposed livestock use will not affect any known locations. In addition, there will be no off site impacts of the proposal that will affect any known sites.

If species likely to occur within the study area do actually exist, the proposed action is expected to be beneficial. Species presently occurring would have survived the affect of livestock grazing over the past 80-100 years. Delaying livestock turnout dates, reducing utilization levels and providing periodic deferment or rest will beneficially impact species in the same manner as the proposal impacts other forb species. Populations would be expected to increase.

On the ground field inspections of land treatment and water development projects as described in Chapter 1 will insure that these actions do not adversely impact a threatened or endangered species population that may exist.

Impacts on Livestock Grazing

Impact Assessment Techniques and Reliability

Prediction of impacts on livestock grazing are based primarily on indirect comparisons with grazing systems implemented elsewhere, research studies, and professional judgment. Most information required various degrees of extrapolation to permit application to the study area since studies rarely occurred under situations similar to those proposed for the study area. Impacts are described in a general manner, rather than as precise predictions of animal weights, death loss, or percentage calf crops, because animal husbandry practices, which also have an effect on livestock and livestock performance, would be left entirely to the rancher's discretion under the proposal.

Livestock Use

The proposal would have short-term adverse impacts on livestock grazing but long-term (20 years) beneficial impacts.

The primary adverse impacts would result from reduced or cancelled livestock use and later turnout dates. During the initial cycle of the grazing systems, livestock gains would be adversely affected. Livestock would be grazed in different areas at different times of the year, causing disorientation and reduced weight gains. After approximately one cycle livestock performance would be expected to improve.

Implementation of grazing systems requiring the combination of several allotments and different livestock herds into one grazing system would require increased livestock herding and sorting on some areas. Overall livestock herding and management costs would increase. Additional maintenance of proposed fences and water developments would also be required.

Proposed seedings would offset livestock reductions and losses in spring forage on Management Areas 3A and 3B.

Long-term beneficial impacts would be expected. Increased forage availability and quality resulting from light or moderate use and improved range conditions, would result in improved animal nutrition. More cows would conceive, increasing calf crops. Cows would breed within a shorter time period, resulting in an earlier, more uniform calf crop. Correspondingly, heavier weaning weights would result. Improved nutrition would also promote lactation, growth, and fattening processes, thereby contributing to heavier cows and calves. Proposed stock water developments would improve livestock performance by reducing the trailing distance to water. Livestock distribution and forage utilization would become more uniform. In 20 years livestock use would be expected to increase from present levels of 56,730 AUMs to 95,632 AUMs.

Analysis of economic impacts resulting from increases and decreases in livestock use is found in the section on social and economic conditions of this chapter.

Impacts on Wildlife

Impact Assessment Techniques and Reliability

Impacts were predicted based upon: (1) direct comparison of cause and effect; (2) indirect comparison of cause and effect; and (3) best professional judgment. Selection and application of each type of analysis depended upon data availability.

Direct comparisons are possible for nongame species responses to no livestock grazing and for habitat changes under no livestock grazing. Field studies conducted by BLM (1978) compared nongame wildlife use on grazed and ungrazed habitats.

Indirect comparisons are most often based on an analysis of pertinent literature and BLM-conducted field studies. An example of indirect comparison is the analysis of impacts of a four-pasture rest-rotation grazing system on antelope. Although no data were available that reported the impacts on antelope of just such a management system, the grazing system characteristics were compared with management guidelines published for optimum antelope response. The comparison showed the grazing system conformed to all recommendations made for consideration of antelope in grazing systems. The antelope population known to occupy the habitat within the grazing system was then predicted to respond at the highest expected rate based on a comparison of antelope increases elsewhere, as reported in the existing literature.

The scarcity of documented wildlife response to grazing systems requires frequent use of best professional judgment. An example is the analysis of the impacts of a four-pasture grazing system on nongame wildlife. No data could be found to allow direct or indirect comparison of impacts. Best professional judgment, based on nongame survey information collected from grazed areas and ungrazed areas was used to predict impact on habitat and wildlife. Most often, professional judgment is used in combination with indirect comparison.

Because of the risk of predicting the future for highly variable and dynamic wildlife populations, monitoring of impacts after program implementation is required to verify impacts and to insure that management goals are being met.

Game Species

Short-term impacts of the proposed grazing management would generally be beneficial for game species. Competition for spring forage between livestock and deer and antelope would be reduced as much as 100 percent (in Management Area 2A) due to later turnout dates. Utilization limits could reduce competition by 40-60 percent (Management Areas 2A, 4C). Reduction in competition would result in improved physical condition of the animals, increased fawn and kid survival, and reduced mortality.

Periods of rest and fencing of meadows would eliminate disturbance of sage grouse nests, resulting in increased chick survival (Management Areas 2A, 3A, 3B, etc.).

In the long term, species and habitat would respond positively to the proposed action. Deer numbers would increase from 1,800 to 2,450 and antelope numbers would increase from 1,200 to 2,500. An 85 percent decrease in sage grouse nest disturbance and destruction would yield slight beneficial impacts (Autenreith, personal communication, 1979). Meadows, a key to sage grouse chick production, would improve in quality. Overall quail habitat would improve slightly, while chukar habitat would not significantly change.

Nongame Species

The combination of later turnout dates and utilization limits would benefit nongame species in the short term. Residual vegetation would increase providing improved habitat. Nongame nest disturbance would be substantially reduced.

Species abundance and richness would increase in the long term, although changes would vary from habitat to habitat. The most significant improvements would result from: (1) a decrease in habitat structural change currently resulting from grazing; and (2) increased protection of breeding birds presently being impacted by heavy spring grazing. Significant increases in bird production would be expected.

Riparian and Aquatic Habitat

Aquatic habitat would improve as a result of fencing of streams, particularly Sand Creek, in Management Area 3A. The most important riparian areas would also improve dramatically under livestock exclusions. Increased riparian vegetation would result in lower stream temperatures and decreased bank erosion. Total bird use, richness, and production would increase, stream quality would improve, and total wildlife value would increase. Unfenced smaller streams would generally show moderate improvement.

Long-term impacts by sub-unit are summarized below.

Sub-Unit 1, High Rock

Nongame wildlife use would increase by up to 400 percent in some habitats. Species diversity would increase. Golden eagle, prairie falcon, and red-tailed hawk productivity would increase, although overall raptor populations would not be expected to change. Deer would increase by 25 percent (100-125) and antelope would increase by 150 percent (450-1,125). Bighorn sheep could be reintroduced without livestock competition and with reduced disease risks.

Sub-Unit 2, Massacre Mountain/Nut Mountain

Forage competition during spring between livestock and wildlife would be reduced by 90 percent. Total forage utilization by livestock would be reduced by 12.8 million pounds annually. Livestock use of key browse species would be reduced 40-60 percent. Deer numbers would increase by 50 percent to 775 and antelope numbers would more than double, increasing to 640. Nongame wildlife use would increase although individual species response would be variable.

Sub-Unit 3, Long Valley/Sand Creek

Plowing and seeding of 21,000 acres would reduce nongame bird use 50 percent on seeded areas (126,000 birds over 20 years). On native ranges in Long Valley nongame bird production would increase and sage grouse populations would increase. Forb availability would increase by 230,000 pounds due to elimination of spring livestock grazing. Antelope numbers would increase by 75 percent to 280 and deer numbers would increase by 25 percent to 200. Sand Creek (300 acres of riparian habitat) would support a 100-percent increase in wildlife use.

Sub-Unit 4, Mosquito

Less intensive management would have unknown impacts. An increase of 5.2 million pounds of vegetation resulting from livestock reductions would provide increased wildlife forage and cover. Over 80,000 acres would be free from grazing each season. Browse availability would increase 25 percent. In Management Areas 4B and 4C deer numbers would increase by 25 percent (475-600) and antelope numbers by over 60 percent (335-570). Fenced streams would improve from "poor" to "excellent" condition and would support a 100-percent increase in wildlife use. Recent literature shows unfenced streams would generally improve but would still be in "poor" habitat condition.

Impacts on Wild Horses and Burros

Impact Assessment Techniques and Reliability

The impact assessment of vegetation changes on wild horses is based on a dietary analysis study recently conducted by BLM in 1977 on similar ecological sites immediately adjacent to the study area. Similarity of present vegetative conditions between areas increases the accuracy of impact assessment. The assessment of impacts of the proposed management on wild horses and burros is based on proposed wild horse and burro use levels.

Wild Horse Use

Wild horse numbers would be reduced from 705 to 260 and the two wild burros currently would be removed.

The proposal would have short term beneficial impacts on those wild horses remaining within the study area. Improvement in the condition of ecological sites would increase the percentage of most plants preferred by horses.

Dietary analysis of wild horses ranging on ecological sites characteristic of this area indicates that their diets are primarily composed of grasses. During April through November, their diet consists of 94 percent grass and 6 percent forbs. Dominant grass species include wheatgrasses, fescue, sedges, needlegrass, and squirreltail. The dominant forbs are poverty weed, lupine and balsamroot.

During December through March, 80 percent of their diet is composed of grasses. The species utilized were similar to those listed above. The remainder of the horse diet during this period is composed primarily of shrubs, of which sagebrush is dominant (BLM, 1977).

Removal of 11 miles of pasture fence in Massacre Mountain/Nut Mountain would enhance seasonal wild horse movement. However, construction of pasture fences and fences around meadows, streams, and other sensitive habitat areas would disrupt existing horse use patterns. Impacts would be greatest during the first year but would be reduced as horses become accustomed to new fences.

There would be no horses in High Rock and in the custodial management area.

Improvement in range condition would result in substantial increases in bluebunch wheatgrass, Idaho fescue, sedges, Thurber needlegrass, and squirreltail in the long-term throughout areas inhabited by wild horses.

The sagebrush cover would not be expected to change significantly on most ecological sites within 20 years, thus sufficient quantities would be expected to remain to satisfy horse needs.

The availability of forage would vary with grazing management systems and livestock utilization limitations. Later livestock turnout dates, light or moderate use limitations, and periodic rest from livestock grazing would ensure that forage would be available on most sites.

Animal health is judged to be satisfactory under present conditions but would be expected to improve because of increased availability of preferred forage species.

Impacts on Cultural Resources

Impact Assessment Techniques and Reliability

Archaeological and historic sites are highly vulnerable, nonrenewable resources. When they are physically disturbed, information on the past is irretrievably lost; when they are destroyed, no technology can recall them. As a consequence, even a gradual rate of attrition may result over several years in a cumulative adverse effect of great severity. Elements of the proposed action may in certain ways accelerate the physical alteration of these resources beyond the range at which they would deteriorate naturally. All direct impacts would be related to the effects of livestock grazing.

Under any system of management, the physical presence of livestock on cultural sites results in alteration of their original condition. Three factors are involved, all products of trampling:

Breakage of Surface Materials: Livestock trampling may obscure or destroy information relative to artifact typology, chronology, or function, and may introduce random variation which would make statistical treatment (and interpretation) of these attributes impossible. Roney (1977), for example, demonstrated significant physical damage to artifacts in an experiment designed to test livestock impacts at one intensity of grazing. Forty-eight percent of his sample showed some alteration after a controlled episode simulating 12 years of continuous grazing at a stocking rate of one cow per 20 acres.

Displacement of Surface Patterns: Correct interpretation of behavior patterns depends on the identification of relatively unmodified spatial configurations. To the extent that livestock displace surface materials, they destroy information and make some categories of reconstruction impossible. Roney's experiment demonstrated that, at the stocking intensity described above, 38 percent of the sample had been displaced in excess of 0.75 meters. Cumulatively, we would predict that total random displacement of entire surface assemblages would eventually occur. The effect would be magnified particularly at those places where livestock concentrate or pass frequently (e.g., at water sources or along stock trails), and would be most pronounced in areas of sparse vegetative cover.

Disturbance of Subsurface Deposits: By loosening surface soil, or by trampling wet deposits, livestock contribute to erosion and vertical mixing of subsurface features. Information is thereby lost on chronology (sequence of deposition) and association (pattern of deposition). Repeated livestock concentration, especially where vegetative cover is too sparse to stabilize the surface level and soils are already eroding, can result in the eventual depletion of data pivotal to the reconstruction of prehistory. The threat is doubly severe in that springs, at which livestock congregate, host the most significant (informative) archaeological sites.

Impacts of Range Facilities and Treatments

Impacts of range treatments and facilities, as with livestock grazing, generally involve breakage of surface materials and disturbance of subsurface deposits. Degree of impact depends on the activity with plowing operation offering the greatest potential for impact. The greatest likelihood of impact from range treatments is in Sub-Unit 3.

The proposed action, however, contains provision for the identification and protection of archaeological and historic values prior to the implementation of any ground-disturbing activities ("Guidelines for Construction of Facilities and Guidelines for Range Treatments"), and determinations of "no adverse effect" are therefore insured.

Specific intensities of livestock-related impacts, in terms of the number of sites potentially affected in each sub-unit, are presented below.

Sub-Unit 1, High Rock

There would be no adverse impacts on 2,000 predicted archaeological sites. The setting and condition trend of all sites (including the Lassen/Applegate trail corridor and four potential National Register properties) would benefit.

Sub-Unit 2, Massacre Mountain/Nut Mountain

Grazing exclusion would benefit 143 predicted sites, including three known National Register quality districts. Substantially reduced impacts and improved condition trend would be predicted for 877 sites (Management Areas A and B), including five places of National Register quality. Livestock reductions in Management Areas C and E would reduce diffuse trampling on 4,850 predicted sites, but impacts would continue to be intense at places where livestock congregate (affecting two of eight known National Register quality properties).

Sub-Unit 3, Long Valley/Sand Creek

Direct livestock-related impacts would not be substantially changed on the 6,200 predicted sites. Thus, all open sites would continue to be subject to diffuse trampling, and sites where livestock congregate (including four of eight known National Register quality properties) would receive intense trampling. Gradual improvement in range condition and reduction of erosion would improve long-term condition trend for all sites.

Sub-Unit 4, Mosquito

Diffuse trampling would continue to affect 6,608 predicted sites; the intensity of trampling would be somewhat reduced in Management Areas B and C (5,360 sites), but impacts would continue to accumulate. Throughout the sub-unit, places of livestock concentration would continue to receive intense trampling (affecting six of 12 known properties of National Register quality).

Visual Resources

Improved range conditions resulting from the proposal would increase the visual appeal of sensitive habitat areas popular with recreational visitors. Streams, meadows, springs, and aspen stands provide appealing visual contrast with the surrounding arid landscape. These areas serve as desirable rest stops and overnight use areas for backcountry travelers. Improved habitat conditions would increase diversity of both flora and fauna, increasing scenic and natural character in these areas. General improvement in range-land condition would provide low to moderate increases in the area's overall visual appeal.

Areas treated to increase forage productivity through plowing and seeding would contrast with surrounding areas. However, most of the areas proposed for treatment are of low scenic quality and would benefit from carefully laid out treatments designed to conform to landscape variations. Changes in vegetation types would provide desirable contrasts in otherwise visually uniform landscapes.

Windmills, stock tanks, stock ponds, and reservoirs have the potential for strong visual contrast. However, through the use of BLM's Visual Resource Management Contrast Rating System, site location, structure, design, and coloration could be developed to effectively reduce the visual impacts of proposed structures. Most structures would be located in Class III and IV "background" and "seldom" seen areas. Adverse visual impacts would be insignificant.

Fences, unlike site-specific structural improvements, extend over miles of open range. The visual impact of a fence itself can be greatly reduced by coloration and location. However, vehicle access routes associated with fence construction and servicing create far greater visual impacts than the actual fence structures. Construction of fences by vehicle-equipped crews would therefore, have distinct adverse visual impacts.

Overall, the proposed action would not have a significant impact on recreational use of the study area. Most actions would improve visual qualities of the recreational use areas and would result in higher quality recreational experiences.

Wilderness

The proposed action should produce high overall positive impacts on wilderness resources within the planning unit. Although elimination of wild horses and burros from Sub-Unit 1 and 2D will remove opportunities to view these animals,

elimination of livestock and wild horse grazing in these areas, and reducing livestock grazing within the other sub-units will enhance vegetative growth with trend toward climax vegetative condition in those areas where grazing is eliminated, improve water quality, decrease soil erosion, increase wildlife populations and species diversity including the reintroduction of bighorn sheep and lessen the destruction of archaeological sites from livestock trampling. Although livestock grazing is a recognized use in wilderness areas, it still suggests human presence and can lessen a visitor's wilderness experience. Overall lessening of visual impacts from livestock presence and eliminating these impacts from Sub-Units 1 and 2A will greatly enhance the feeling of natural integrity of the landscape.

Impacts of Social and Economic Conditions

Impact Assessment techniques and Reliability

The analyses of the economic impacts of the various proposed alternatives upon the affected ranching community utilized both ranch budgeting models and individual interviews with 22 of the 34 Cowhead/Massacre permittees.

A general estimate of the severity of the impact of the proposal on the permittees' operations was calculated from a ranch budgeting schedule. Estimates of 1978 costs and revenues for an average 500-cow Modoc County operation, supplied by the Agricultural Extension Service, were altered in response to the proposal's average grazing reductions. This is a fairly reliable measure of the degree of impacts on costs and returns in the very short term (i.e., before the rancher alters more than one method of operation in response to the proposal). The extent of the reductions in net returns calculated in this manner accurately portrays the need for ranchers to adjust their operations if they are to remain in business following the proposal's implementation.

The limitation of this general approach is the failure to recognize the levels of land and capital upon which individual ranchers can draw. Therefore, interviews with most of the permittees based in the county were conducted to provide a subjective estimate of the proposal's impact on their operations. In the cases of major reductions (say, greater than 30 percent for those ranches having moderate or high dependencies upon public forage), the ranchers' assessments are probably reliable. The impact analysis of reductions of less than 30 percent required use of additional professional judgment. In the latter cases, and in the former cases to a lesser degree, there is a margin of error. Numerous independent variables are involved in predicting the ranchers' responses. Future prices of ranch inputs and outputs, individual managerial skill, and the level of indebtedness in the year of the proposal's implementation are a few of the factors that are impossible to incorporate into the impact models. However, great reliability can be attached to the general findings depicting the severity of impacts of the proposal on most ranchers.

Community and regional impacts of the proposal are ultimately based upon the individual ranch's ability or inability to adjust. The loss in county livestock sales, derived from the assumption of nonreplacement of the foregone BLM forage from other sources, estimates a "worst case" situation. However, the low level of calculated reduction in the total county sales increases the percentage of confidence in this procedure.

Economic Conditions

The management plan proposed for the Cowhead/Massacre Planning Unit would introduce two changes in present livestock grazing patterns: (1) reductions in the numbers of livestock, and (2) changes in the seasons of use. The greatest change over present practice would be the deferral of spring grazing until later in the season. Whereas the total reduction in permitted AUMs would be 30 percent, spring grazing would be reduced an average of 73 percent. Approximately 42 percent (23,834 of 56,730 AUMs) of the forage presently harvested by livestock is taken before June 15. The proposal would shift the grazing season to later in the year, licensing only about 19 percent (6,343 AUMs) of the annual harvest of 34,273 AUMs before June 15.

Individual Ranch Responses: Four ranchers would probably cease operation in the planning unit as a result of this proposal. One, Earp, is not part of the Surprise Valley community and does not depend upon this ranch for his livelihood. The other three operators are family ranchers and are part of the Surprise Valley community.

In addition, 13 operators would have to make substantial changes to continue their ranching operations. Some of these operators could also be forced to give up their ranch operations. Of the 13 operators, five do not reside in Surprise Valley (Kirkpatrick, Kyte, Schadler Ranches, Weber, and Wolfsen MC Ranch). Kirkpatrick and Wolfsen have other major sources of income and would not be economically jeopardized by the proposal. The rest of the operators are family ranchers who would be economically vulnerable to major changes in forage supply.

The net effect of the proposal on ranch ownership would be a reduction in the number of ranch owners. In most cases, when a rancher sells out, the new owner continues to operate the ranch even though the previous owner may have been unable to continue financing his operation (Centaur Management Consultants, 1978).

A multitude of factors complicates any precise assessment of the impacts of the proposal on the individual ranches. Economic models that apply relatively static technical input coefficients to the problem of ranch production are of limited value in predicting the responses of an individual operator to a change in available resources. Uncertainty of future economic and technological conditions further confuses the issue. Additionally, we deal not only with technical relationships of production, but with the individual rancher's propensity, in some cases, to radically alter a method of ranch management that has prevailed for decades. All of these factors rule out the possibility, in most cases, of making concrete statements of who would be forced to give up ranching.

Therefore, the following section will only consider the impacts of the proposal upon a 500-cow ranch considered characteristic of the study area. (See APPENDIX G for the assumptions used to develop this model ranch.) A few responses which the ranchers might consider to replace the BLM forage no longer available for livestock use will be analyzed for their effects on net ranch revenues (i.e., those revenues available after the annual cash operating costs are paid). The results from this analysis should not be viewed as precise measures of actual returns following the implementation of the proposal. However, the analysis does show the relative impacts of the proposal on ranch incomes.

The sub-unit impact analysis section later in this chapter includes a more detailed analysis of the proposal's impacts on the individual ranchers.

The proposed action may combine operators into common allotments in five of the eleven management areas. Although final determination of these combinations would not be made until the preparation of the separate AMPs, some mention will be made here of the possible impacts. Forming common allotments from presently individual allotments would further increase the average variable cost per cow permitted to run on the planning unit. Most of this cost increase would result from the gathering and separating of livestock at the end of the grazing season. These costs would primarily be a function of the number of livestock and the number of different operators in the different management areas. Actual cost increases cannot be quantified. (By way of comparison, the Alkali group, composed of Weber, Hussa, and Heryford, expend about ten days and use five people to gather and separate 1,700 head off the Sheldon in the fall.)

TABLE 3-9 shows the management areas that may be affected by combining allotments. Although no decisions have been made, the table will give some idea of the number of ranchers facing added costs in the different areas by combining their present allotments with more ranchers.

The proposed action would close management area 2A to livestock grazing two out of every three years. This would force the two operators in this area to find replacement feed sources. This matter is discussed more fully in the sub-unit 2 analysis. However, as noted there, the proposal would end the usefulness of the area for regular use. Some of the possible uses to which the area may be put during use years could be to allow light or non-use of the ranchers' private range or meadowlands, or to possibly hold calves over the winter prior to use-years in order to use Area 2A for yearling range. However, the costs accruing to the ranchers during the two years of non-use would outweigh any potential benefits of the use year.

Not included in the sub-unit analyses are separate mention of at least four ranches and their attached BLM grazing permits owned by non-valley residents and leased to planning unit permittees (Laxague, Page, Jones, and Wolfsens). Three of these leased permits are held in Sub-Unit 3 and one is leased in Sub-Unit 4. The proposal's impact on these lease values is ambiguous: The change in seasons of use and in allowed cattle numbers would lessen the usefulness of the attached grazing privileges. However, the base properties

TABLE 3-9

Areas Potentially Affected by Combining Present
Allotments into Common Allotments

<u>Management Area</u>	<u>Number of Ranchers Potentially Affected</u>	<u>Maximum Number of Cows if Allotments Combined</u>
2E	6	1,743
3A	10	1,198
3B	14	1,718
4B	9	1,142
4C	4	1,865

should increase in value for either purchase or for early season grazing lease to other operators due to the area-wide reduction in early spring grazing permitted on the public lands. It is doubtful that there would be any significant change in the income accruing to the owners of these parcels under the proposed action.

Impacts on Model Ranch: For purposes of analyzing the general impacts of the proposal on the permittees, a model ranch was postulated. The potential effects of the proposal upon operating costs and annual gross revenues are presented in TABLE 3-10. As seen in TABLE 3-10, there would be four alternatives for dealing with the proposed action, each representing a minimal response on the part of the rancher. One, leasing pasture to compensate for loss of BLM forage, would result in an initial reduction in net returns of 35 percent below present levels, the least reduction of the four alternatives. The greatest loss, 93 percent, would occur if the rancher were to reduce his herd commensurate with the BLM cutback. The other two alternatives, developing irrigated pasture and buying hay to replace lost forage, would result in reductions in net returns of 40 percent and 70 percent, respectively, during initial stages of implementation of the proposal.

Over the 20-year period following implementation of the proposal, the forage available for livestock would increase as range conditions improve. Hence, reliance on purchased hay or leased pasture would decrease as more public land grazing is licensed. Herds that were initially reduced in numbers would slowly be rebuilt. For purposes of this analysis, any irrigated pasture developed would be maintained, with yearling steers purchased to graze the pastures as the cows originally removed from the public lands are gradually returned. (The assumptions behind the increase in forage availability are presented in APPENDIX G).

Assuming an average five-year administrative response time in adjusting permits to take advantage of the increasing forage availability, net revenues after annual operating costs have been paid would approximate those figures given in TABLE 3-10 for the model ranch. The initial economic severity of the proposal would be lessened somewhat over time. By the twenty-first year of the proposal, net revenues should be close to those revenues realized presently for this model ranch for three of the ranch responses analyzed. Net revenues could potentially increase by up to about 78 percent if the ranch were to develop irrigated pasture to handle the initial reductions in BLM forage, then gradually stock this pasture with purchased yearling steers as grazing permits are adjusted upwards. Of all the ranch adjustments possible, development of irrigated pasture would appear to be the best for maximizing net returns, but many of the ranchers would have difficulty obtaining sufficient credit due to their existing debt loads.

The discounted net returns from leasing pasture would be similar to those realized from developing additional irrigated pasture. However, as will be seen later, leasing additional pasture would be a viable alternative for only a small number of ranchers due to the limited supply of leasable pasture land in the region.

TABLE 3-10

NET REVENUES AFTER PAYMENT OF ANNUAL CASH COSTS^{1/} -
PRESENT SITUATION AND UNDER THE PROPOSAL - 500-COW OPERATION

Ranch Response	YEARS 0-4 ^{2/}		YEARS 5-9		YEARS 10-14		YEARS 15-19		YEAR 20		PRESENT VALUE OF DISCOUNTED STREAM OF NET RETURNS AT 6 1/2% - 21 YEARS		PRESENT VALUE OF DISCOUNTED STREAM OF NET RETURNS AT 12% - 21 YEARS	
	\$	% Change From Present	\$	% Change From Present	\$	% Change From Present	\$	% Change From Present	\$	% Change From Present	\$	% Change From Present	\$	% Change From Present
Present Situation	20,397		20,397		20,397		20,397		20,397		245,138		172,750	
Leased Pasture	15,110	-26	15,304	-25	15,691	-23	16,585	-19	20,415	+	176,541	-28	122,431	-29
Developed Irrigated Pasture	14,338	-30	14,952	-27	16,279	-20	19,838	-3	36,337	+78	183,342	-25	127,147	-26
Bought Hay	9,702	-52	10,109	-50	10,988	-46	13,162	-36	20,415	+	122,367	-50	84,861	-51
Herd Reduction	6,198	-70	7,708	-62	10,425	-49	14,336	-30	20,415	+	101,174	-59	70,164	-59

^{1/} The costs considered here do not include returns to family labor, depreciation costs, or any interest payments on accumulated debts.

^{2/} "YEARS 0-4" refers to the year of the proposal's implementation and the following four years.

General Distribution of Cost Increase: TABLE 3-11 shows the changes in permitted use by operator. In order to assess the probable distribution of cost changes among the ranchers resulting from the proposal, ranchers were divided into 12 groups. Classification was based upon the ranchers' seasonal dependency on the public lands and upon the nature of proposed changes in permitted AUMs during spring, summer, and fall grazing seasons.

Estimates of the increased operating costs for each rancher were added together in each group to determine the average increased cost. These cost increases were derived from interviews with most of the permittees. The results are detailed below in the sub-unit analyses. These costs were compared with the estimated present operating costs, derived from either rancher interviews or from the University of California Agricultural Extension Service (1977) cost estimates, for each group.

Using this procedure, it is possible to compare the groups with respect to relative cost increases resulting from the implementation proposal.

These results should not be viewed as precise indicators of operating cost increases. However, the analysis does show the distribution of increased costs among the different groups.

Those ranchers running more than 30 percent of their herds on the public lands during the BLM permitted season of use (i.e., seasonal dependency exceeds 30 percent) would be affected the most severely by the proposal. Twenty-one ranchers would fall into this category.

The ranchers who would be least affected by the proposal are characterized by low seasonal dependency on the Federal range, with increases proposed in their levels of summer and fall grazing. Costs to maintain present herd sizes would still rise but would be moderated by the increased grazing levels later in the season.

The purpose of this general analysis has been to determine who, among the ranchers, would bear the highest private costs or would need to make the greatest management changes should the proposal be implemented.

The impacts of the proposal would probably cause the following changes in the structure of the planning unit's ranching economy:

- (1) The relative cost of spring feed would increase. Presently, turning livestock out onto the public lands in the spring is the best alternative for the ranchers. Getting the cattle off private meadowland is necessary for hay production--leasing pasture during the spring, even if available, would be expensive. Hence, a feed source more expensive than the public range would have to be found to replace lost forage. In most cases, the amount of available spring feed would be the limiting factor in the year-long ranching enterprise.
- (2) Adjusting to the increased cost of spring forage would entail one or more of the following responses:

TABLE 3-11

CHANGES IN ACTUAL USE UNDER THE PROPOSAL BY OPERATOR

<u>Permittee</u>	<u>1978 Actual Use (AUMs)</u>	<u>Proposed Use (AUMs)</u>	<u>% Change</u>
Berryessa	2,178	2,026	- 7%
Bordwell	1,040	874	-16%
Bunyard	3,248	1,228	-62%
Cal-Vada	3,133	2,593	-17%
Carey, F. & J.	121	102	-16%
Carey, P. & J.	154	129	-16%
Cockrell	177	149	-16%
Coops	1,702	665	-61%
Earp	8,283	2,414	-71%
Hill ^{1/}	722	0/479	-100%/-34%
Fee	3,371	2,876	-15%
Hapgood	496	650	+31%
Harris	895	752	-16%
Heryford	1,100	613	-44%
Hill, N.	2,004	2,625	+31%
Hussa	1,838	790	-57%
Jones	392	465	+19%
Kirkpatrick	2,433	3,101	+27%
Kyte	1,111	900	-19%
Laxague	1,104	1,022	- 7%
Marx	1,588	580	-63%
Page	352	406	+15%
Parman, J. ^{1/}	1,364	583/1120	-43%/-18%
Parman, R.	128	119	- 7%
Peterson	369	414	+12%
Quirk	560	731	+31%
Schadler, G.	57	57	-
Schadler Ranches	6,315	4,600	-27%
Smith	166	217	+31%
Steward	560	545	- 3%
Warren's Ranch	1,548	1,617	+ 4%
Weber	7,076	2,537	-64%
Wolfsen's	1,145	927	-19%
TOTALS	56,730	39,013/39,970	-31%/-30%

^{1/} The first proposed use figures for Hill and Joe Parman are for the two of three years of non-use in Management Area 2A. The second figure includes the use year in Area 2A.

- (a) Increased Inputs of Land - The ranchers with greater capital resources might purchase or lease additional pasture or range land. This alternative would be limited by supply, since over 75 percent of both Modoc and Washoe Counties' land area is unavailable for private range or pasture development due to Federal or State ownership or topographical constraints. Land ownership patterns would probably change, accelerating the trend toward fewer, larger ranches.
 - (b) Increased Inputs of Capital - More intensive cultivation on the base property might provide sufficient feed to compensate for the reduced grazing privileges. The annual cash costs for irrigated alfalfa and for irrigated pasture are about \$18.00 (Reed, 1977) and \$16.25 per AUM, respectively. A mixture of alfalfa for sale and for feed on the ranch would moderate the proposal's impact. Limitations of this alternative would be capital, land, and water resources.
 - (c) Decreased Dependency on Spring Forage in the Annual Feeding Regime - Shifting from the dominant cow-calf type of operation to a stocker or a cow-yearling operation would minimize the loss in net returns to some ranchers (Cothorn, 1977; Agricultural Extension Service, 1978). Both studies cited assumed, however, that no change in Federal grazing privileges would occur. To achieve the reported increases in net returns following the proposed BLM reductions would require additional land and/or capital investment.
 - (d) Herd Reductions - Less reliance on the Federal range could be attained by reductions in herd size. However, herd reductions would tend to cut ranch revenues more than they would cut costs because many costs are fixed in the short run. In order for this to be a viable alternative, the rancher would either have to reduce his scale of operation by reducing his present land and capital stock, or increase the diversity of his output by sales of alfalfa or other crops, or by seeking off-ranch employment. Additionally, the average debt load of the permittees appears to be about 50 percent of total ranch value. Hence, annual repayment obligations require a minimum level of annual livestock sales, which would make herd reductions impossible for many operators.
- (3) Marginal ranch operations, with inadequate supplies of land or capital to implement the above strategies, might be forced out of ranching, as the more financially sound and resource-rich operators or outside investors buy additional land. The identification of a marginal ranch is based on the following two factors: (1) rancher-owned equity in the total ranch value is less than 50 percent, and; (2) money left after the obligatory annual ranch cash costs (e.g. operating costs, interest costs, etc.) are insufficient to cover family labor and/or payments on borrowed principal. Under these definitions, the last four years of low cattle prices and dry weather have rendered most of the permittees' operations marginal. However, an entirely different financial situation

may exist after several years of good beef prices. If these marginal ranchers were unable or unwilling to convert to a more efficient, smaller operation or to increase crop production, the entire ranch might be sold. However, if the family's income could be augmented with an off-ranch job, the marginal ranches might stay in business as part-time endeavors of the family.

Potential impacts of the proposal upon the individual permittees is discussed in the following sub-unit analyses.

Regional Livestock Sales: The impact of the proposal on regional livestock sales would vary with the cumulative rancher responses. If the predominant alternative chosen by the permittees were to retain present herd sizes by purchasing or developing alternative feed sources, regional livestock sales would not change from present levels if all other factors remain constant. However, as seen earlier, disposable ranch incomes would decline substantially for the permittees. At the other extreme, if all of the permittees were to reduce their herds to a size commensurate with the proposal's permitted levels of grazing, approximately 1,455 brood cows would be liquidated. The first-year impact of the proposal would be to increase beef sales of the permittees by about 19 percent (i.e., the sale of 1,455 cows would increase present sales of \$3.5 million from the livestock inventory of the permittees by an additional \$512,000.

The changes in the level of Modoc County livestock sales would be composed of two components: (1) a first-year increase of about four percent resulting from the herd reductions; and (2) a reduction beginning at about two percent in annual sales after the first year, declining almost to zero as grazing on the public land regains present levels.

Using the estimates of the in-county expenditures made by the livestock sector derived for Lassen County (Goldman, 1974), approximately \$6 million of the \$11.1 million of purchases made by the Modoc County livestock sector in 1977 were made outside of the county. The value-added portion of Lassen County's livestock sector purchases, defined as the difference between total expenditures for all inputs to the livestock sector minus those purchases made within the county, was determined to be 54 percent (Goldman, 1974). Therefore, the decrease in annual county livestock sales of approximately 8 percent would result in an actual loss of about \$84,900 flowing into the county's economy from the livestock sector.

Again, all of the above assumes that the ranchers would choose to reduce their herds to accommodate the proposal rather than seek additional forage. Therefore, even this maximum estimate would have little effect on the county's \$44 million agricultural economy.

Long-Term Effects: Some of the ranch management adaptations necessitated by the proposal would continue to be required 20 years after the proposal's implementation. Specifically, projected spring-time use would nearly double after 20 years over the proposed initial use, from 7,320 to 12,937 AUMs. However, this would still be a reduction of about 46 percent from the

present harvest of 23,834 AUMs taken before June 15. The proposed later turnout dates would still be in effect, causing this reduced level of spring grazing. However, by the end of 20 years, it would be probable that those ranchers who successfully adapted to the proposal would have developed additional spring grazing capacities and that they would have the ability to take advantage of some of the 60 percent increase in allowed livestock use (from 56,730 to 95,632 AUMs).

This projected increase in grazing use would have a salutary impact upon the ranches still operating in 20 years. TABLE 3-12 projects the potential livestock use, by management area, in 20 years under the proposal. The incidence of the potential increase in livestock sales resulting from this increase cannot be predicted due to the uncertainty of ranch ownership patterns in 20 years. However, if complementary sources of forage and feed could be obtained, the projected cattle increases might increase the permittees' herds by about 7,800 head. This might increase gross livestock sales of the permittees by 32 percent over present sales (1977), assuming that the livestock inventory of the planning unit's permittees is about 24,655 brood cows.

The exact rate of increase in forage production cannot be calculated. Therefore, the rate at which livestock numbers are increased in response to improved forage quantity and quality is uncertain between the initial proposed stocking levels and the projected use after 20 years. It is probable that present livestock AUM levels would be reached after 10-15 years. Although this would seemingly allow a return to present operations, the delayed seasons of use would still be in effect. The initial impacts, resulting from the delayed seasons of use (e.g., those impacts requiring the development of non-BLM sources of spring feed) would still be the limiting factor in most of the permittees' year-round feed schedules. However, those ranchers who had earlier managed to adjust to the proposal would be able to take advantage of the increases in permitted use, assuming that they would have developed alternative spring feed sources.

Estimates of the local or regional impacts of such sales increases are tenuous, since the ownership and capital dependencies of the ranches in 20 years are unknown.

Overall Community Effects: Land prices would probably continue to increase as land becomes more of a limiting factor in ranch production. Increased investment in land improvements would also increase prices and values. These conditions should further slow the rate of recent population growth in the valley, as small-acreage lots become more valuable for ranch additions than homesites.

Commercial businesses in the valley would suffer under the proposal. Interviews with most of Surprise Valley's merchants indicate that sales to non-residents comprise, on the average, less than 10 percent of total gross sales. The owner of one of the major stores in the valley estimated that sales to rancher households account for about 60 percent of their total sales (Hutchens, 1978). The proposal could decrease the gross livestock sales of the Surprise Valley by up to 19 percent (6,000 head reduction

TABLE 3-12

LIVESTOCK USE BY MANAGEMENT AREA EXISTING, PROPOSED, AND PROJECTED USE AFTER 20 YEARS

Management Area	Existing Use (AUMs)	Proposed Use (AUMs)	Change from Existing (AUMs)	Livestock Use in 20 Years (AUMs)	Change from Existing After 20 Years (AUMs)
Sub-Unit 1	5,000	0	- 5,000	0	- 5,000
Sub-Unit 2 (1 yr.)	1,445	265	- 1,180	1,113	- 332
A (3 years)	4,335	957	- 3,378	3,339	- 996
B	1,172	0	- 1,172	0	- 1,172
C	2,242	975	- 1,267	2,961	+ 400
D	400	0	- 400	0	- 400
E	14,082	601	- 7,981	12,752	- 1,330
Sub-Unit 3 ^{1/}					
A	5,821	5,410	- 411	10,055	+ 4,234
B	7,947	10,422	+ 2,475	29,040	+21,093
Sub-Unit 4					
A	2,121	2,121	0	2,121	0
B	6,121	5,139	- 982	12,986	+ 6,865
C	10,379	8,391	- 1,988	22,378	+11,999
TOTAL	56,730	39,970	-16,760	95,632	+38,902
Approximate Number of Livestock on Public Lands During Peak Season of Use (Head) ^{2/}	11,890	8,323	- 3,567 (Head)	21,600	+ 9,710 (Head)

1/ AUM figures combine native and seeded area.

2/ Peak season dates used to estimate maximum number of head on the Planning Unit were June 1st for the existing situation and September 1st for the proposed action.

divided by 31,500 head in the Valley) before range improvement occurs. This assumes the permittees would reduce their herds as a response to the proposal. Other responses, such as developing irrigated pasture, would not decrease local livestock sales but would still have a depressing effect on the amount of disposable income the ranchers might spend in the valley. However, this would be less than the reduction in income resulting from reducing herds. Hence, the gross sales of the valley's merchants might decrease up to 11 percent (19 percent livestock sales reduction multiplied by 60 percent of merchants' business). This is the maximum decrease in retail sales that could be expected to occur solely from ranch accounts. Secondary impacts upon retail sales could occur from other sources, primarily from any cutbacks in the hiring of ranch hands. The total reduction in sales would, however, probably be less than 10 percent because many ranchers would actually reduce their herds less than the amount assumed here. The loss in livestock sales would probably be replaced to some extent by increased sales in other agricultural sectors.

Indirect Economic Impacts: The proposed action would have varying impacts on all resource values. Unfortunately, methods of placing dollar values on the entire range of affected resources are either lacking or inadequate due to an inability to identify, much less to assign a dollar value to, all of the tangible and intangible impacts of the proposal.

TABLE 3-13 attempts to isolate the various resources affected by the proposed action and present in a non-quantitative manner the direction of the impact. Thus, by way of example, the impact on local family-sized ranches will be mostly intangible. There is a positive cultural value associated with the western family-run cattle ranch. Many people throughout the country would like to see this lifestyle continue. The proposal would endanger this lifestyle; hence, the negative intangible value of the proposal on this resource. No attempt was made to value the tangible impacts on this resource. Such valuation would be based on the relative efficiencies of resource deployment among different beef production techniques. These considerations are irrelevant here.

Social Conditions

The social environment of the Surprise Valley, a complex organism composed of many variables, would be more resilient to change than individual ranchers. The loss of one or two or three ranchers would not bankrupt the social resources of the valley. If some ranchers were to sell out to outside investors, there would be some decline in social cohesion, depending upon the number of ranchers selling out and upon their present status in and contribution to the local society. As smaller ranches either go out of business or consolidate their earnings, the present level of identification with the livestock sector by the local non-ranching community would decline. By increasing the average ranch sizes and decreasing the diversity of sizes, the local society would tend towards stratification. As in the natural environment, less diversity in the social structure would lessen the possible numbers of social contacts among groups and would lessen the total cohesion of the social group. However, with the probable continuation of the present

TABLE 3-13

INDIRECT ECONOMIC IMPACTS ON THE PLANNING UNIT'S RESOURCES

	<u>Tangible Benefits^{1/}</u>	<u>Intangible Benefits^{2/}</u>
Soil Erosion	+	
Water Quality	+	+
Range Condition	+	+
Wildlife Habitat Condition	+	+
Non-Consumptive Wildlife Values		+
Wild Horse and Burro Values		?
General Outdoor Recreation	0	0
Hunting	+	+
Visual Aesthetics		+
Archaeological Resources		+
Continuation of Family-Sized Ranches		-

1/ Tangible benefits refer to those impacts for which a dollar value might be calculated, such as the value of changes in forage availability to local livestock producers.

2/ Intangible benefits cannot be easily assigned a dollar value. For example, a rich wildlife environment is highly valued by a great many people, but problems exist in the measurement of a dollar value for this resource.

trend towards fewer, larger ranches, the proposal would quicken rather than initiate the forces causing the marginal operations to go out of business. Irrespective of the cause, the valley's residents perceive a social loss when family ranches (especially those worked for several generations by the same family) are bought by outside investors or by large local ranches. The tradition of the family-owned ranch is strong in the valley, as it is throughout the west.

In summary the proposed action would reduce permitted cattle grazing by 40 percent overall and by 73 percent during the spring season of use. The availability of spring forage/feed would become the limiting factor in most of the permittees' ranches. The severity of the probable reductions in ranch net returns would necessitate fundamental changes in ranch management and in permittee land ownership patterns.

All of the permittees would face operating cost increases resulting from the need to develop replacement feed sources. The number of operations which might not be able to adjust to the proposal and, thus, might be forced out of business would range from four to 20 ranches.

The proposal would have a slight impact on the economy of Modoc County. Annual sales within the county's livestock sector would decrease by about 2 percent. This would be insignificant when compared to the total value of the county's agricultural production.

The impact of the proposal upon the social character of the planning unit would be to accelerate the present trend towards fewer, larger livestock ranches. A decrease in the diversity of ranch sizes would increase stratification within Surprise Valley's dominant social group, the ranching community. This should decrease the feeling of identification with the ranchers by the non-ranching population.

The decrease in social diversity would limit the opportunities for intergroup contacts, thus weakening the present degree of social cohesion.

SUB-UNIT 1, HIGH ROCK

Vegetation

Vegetative Condition and Trend

Within 20 years, most of the area would be in "good" condition (TABLE 3-5). Previously grazed plants that were at a competitive disadvantage in community interrelationships would experience increased vigor as they are released from the effects of livestock grazing. Vigor would decrease in those plants previously benefitting from the loss of vigor of competing species which resulted from grazing. The net effect, however, would be an improvement (trend toward climax) in range conditions.

Improvement would be most evident in the most moist ecological sites (tufted hairgrass-bluegrass, and willow/tufted hairgrass-bluegrass sites) which occur along High Rock Creek and adjacent tributaries. Species reproducing by seed would not receive the beneficial effects of livestock trampling. Thus, although vigor of individual plants would increase greatly, the increase in density (number of individuals per unit area) would not be as rapid for those species reproducing primarily by seed.

Robertson (1971) reported significant improvement on a Nevada sagebrush/grass range that received 30 years of rest. The cover of perennial forbs increased 85 percent, thurber needlegrass increased sevenfold, and bluebunch wheatgrass was reestablishing naturally in favored spots. Only annual forbs and locoweed declined.

Density of basin wildrye, which is associated with most bottomland sites, would increase appreciably. Sandberg bluegrass, squirreltail, bluebunch wheatgrass, and perennial forbs would all show noticeable improvement on upland sagebrush sites.

The rate of vegetative recovery of a given community would primarily depend upon: (1) the vigor levels of individuals and species composition (range condition) of the community at the time of exclusion, (2) availability of soil moisture during exclusion, and (3) reproductive strategies of the particular species involved. Rate of recovery in these more moist habitats would be greatest during the first five years, then would gradually decrease. Recovery rates in the drier ecological sites would be low initially, gradually increasing with time. APPENDIX J describes the response of individual ecological sites.

Vegetative Production

Removal of livestock grazing would provide an initial increase in forage production of approximately 28 percent (hormay, 1970). This increased production occurs because livestock are not removing vegetative growth during the growing season and consequently total vegetative production increases. Initially, forage production would increase from the present 6,000 AUMs to 7,680 AUMs.

As range condition improves, the forage production of individual site increases. By using Anderson's (1978) stocking rate guides, it was determined that forage production would increase by 138 percent. In 20 years, forage production will increase to approximately 15,000 AUMs.

Livestock Grazing

Cancellation of grazing would have maximum adverse impacts on livestock use (TABLE 2-9). This area is used by the Bunyard operation for spring and fall forage, for a sheep trail between summer and winter ranges, and for a spring lambing area. Cancellation of use would have a severe impact on the Bunyard sheep operation, probably rendering it inoperable (see below, Social and Economic Conditions).

Wildlife

Termination of grazing would eliminate the major cause of wildlife habitat degradation. Vegetation removal would be reduced by 90 percent or 6,880,000 pounds annually. Competition for space between livestock and wild horses would be eliminated, and less disturbance of wildlife would result.

Riparian Habitat

Riparian habitat (200 acres) would respond most quickly due to available moisture. Willows would increase in height, density, and distribution along the riparian zone. Bird use would increase significantly in numbers and variety. (Unless otherwise noted, all nongame data and habitat structure data come from the BLM Wildlife Section, Cowhead-Massacre Unit Resource Analysis, available in the Susanville District Office, Susanville California.) Warblers, white-crowned sparrows, green-tailed towhees, hairy woodpeckers, and red-breasted nuthatches and other willow-using species would make the greatest use of riparian habitat. Nesting and nest production would be expected to increase by several times. Development of a dense understory, now absent, and increased cover in the middle and upper vegetation strata would support this nesting increase.

Meadow Habitat

Vegetative cover in the 300 acres of this habitat would increase from sparse to 80-100 percent, depending on the site. The present canopy of brush would be replaced gradually by a canopy of grasses and sedges. The present thin canopy of low sedges and grasses would be replaced by a taller, more vigorous and denser canopy of grasses and forbs. The sagebrush that has invaded the meadows would begin to decrease after 20 years.

Surveys indicate small-mammal diversity would decrease. Invader species from adjacent habitat types would become less prevalent and then occur only as transients. Vagrant shrews and montane meadow mice, species of densely vegetated moist areas, would make up a significant portion of the small-mammal populations.

Numbers of bird species would be expected to remain about the same but invaders from the dry uplands such as Brewer's sparrow, sage thrasher, and gray flycatcher would be replaced by the red-winged blackbird, Brewer's blackbird, and Savannah sparrow of mesic areas. Total bird numbers would increase, with sage grouse being among the most significant increases on good meadows (Oakleaf, 1971).

Low Sagebrush Habitat

The low sagebrush associations (54,000 acres) would change greatly in habitat structure. The upper and middle strata of vegetation would increase in height but the lower layers would not change significantly. Perennial grasses or forbs would be expected to increase in composition but percentage would be small.

Small-mammal populations would change slightly in species composition. Sagebrush voles, pocket mice, least chipmunk, and deer mice would become more abundant, although deer mice would make up a smaller percentage of the population.

Horned larks, Brewer's sparrows, vesper sparrows, and meadowlarks would be expected to be the most abundant birds.

Antelope habitat would improve. An increase in forbs would improve antelope condition before and after fawning.

Big Sagebrush Habitat

Big sagebrush habitat (23,000 acres) would show little change. The most significant difference would be a more open canopy. URA analysis of grazed and ungrazed habitats yielded few differences in nongame wildlife use. Deer mice and least chipmunks would be most abundant. Brewer's sparrows and sage thrashers, which nest, perch, and feed in big sagebrush would be abundant.

Mountain Brush Habitat

Two thousand acres of bitterbrush and mountain mahogany would improve in condition. Grazing would cease, leaving 100 percent of annual growth for wildlife forage and cover. This would (1) increase forage availability by 60-100 percent, (2) increase plant vigor, and (3) reduce hedging of browse plants by 80 percent.

Deer habitat would increase in carrying capacity to the point of being able to support an increase to 130 animals. Bitterbrush and forbs are the major objects of competition between livestock and antelope, and since this competition would be eliminated, antelope habitat would be expected to support an estimated 150 percent (450-1,125) population increase in 20 years. Antelope have averaged a 163-percent increase overall in nearby Modoc County (Pyshora, 1977) since 1960.

Rimrock Habitat

Rimrock areas are not directly affected by grazing, but increased raptor use of rimrock areas for nesting would be expected as nongame wildlife use increases in the surrounding ecological sites. An increase in prey base numbers and numbers of species would result in more stable raptor populations. No increases are expected in the raptor population of High Rock but increased productivity can be expected.

Rimrock areas would also act as escape habitat for bighorn sheep should they be introduced. These areas are an essential habitat component for bighorn. The absence of wild horses and livestock, especially domestic sheep, would be advantageous to bighorn. Bighorn would have maximum opportunities for successful reestablishment in High Rock. Elimination of domestic sheep and wild horses and restrictions on cattle grazing are considered necessary to protect California bighorn sheep habitat (Demarchi, 1975) and are therefore believed necessary for successful implementation of the proposed bighorn reintroduction.

When reintroduction of bighorn sheep occurs will depend on priority given to the area by, and budgetary constraints of, the Nevada Department of Wildlife.

Wild Horses and Burros

Under the proposed action, all wild horses (277) and burros (2) within this area would be removed.

Cultural Resources

The termination of all livestock grazing would have no adverse effects on archaeological and historic resources and would significantly reduce the rate at which they are being depleted. Moreover, removal of livestock as an ecological factor would allow successional changes trending toward pre-grazing climax conditions, thereby enhancing the integrity of setting of all sites within the sub-unit. This effect would especially benefit the High Rock Canyon segment of the Lassen/Applegate Trail corridor, as well as all other National Register quality resources in the area. TABLE 2-15 enumerates the sites currently known to lie within the zone of benefit.

While the elimination of current adverse conditions poses inarguable benefits for cultural resources throughout the subunit, it constitutes nonetheless no improvement over their current condition. Rather, it allows management more realistically to ensure that the present condition may be perpetuated in a theatre of exceptional resource values. Management goals for the subunit may be achieved only if the annual attrition of the resource is curtailed, and they would be substantially enhanced by restoring the original biotic communities within which the prehistoric and historic scenarios were enacted. These results are anticipated.

Recreation

Impacts of the proposed action on recreation are summarized in TABLE 3-14.

These impacts are highly positive for primitive recreation which is the predominant recreational use of this area. Reestablished vegetative communities similar to those encountered by western pioneer emigrants would provide the unique opportunity for present and future visitors to experience a well preserved segment of the Lassen/Applegate Emigrant Trail in virtually the same condition as it existed when the pioneers first traveled the Lassen/Applegate Trail over 100 years ago.

Wilderness

All but a tiny portion of Sub-Unit 1 is either WSA or roadless areas recommended for WSA status. This region has been historically noted for containing potentially high wilderness values. Eliminating livestock grazing would produce high positive impacts on wilderness resources by enhancing the natural character of the landscape. Vegetation would improve with a trend toward climax condition. Water quality would improve, soil erosion decreased and less trampling of archaeological sites would occur. Removing forage competition with wildlife would significantly increase wildlife populations and diversity, thus increasing hunting and wildlife viewing opportunities. Reintroduction of bighorn sheep, a wilderness associated wildlife species, would enhance wilderness values by affording opportunities to view these animals. Some existing livestock developments could be removed and rehabilitated and the need for vehicular travel associated with livestock operations would be ended. Eliminating wild horses and burros, considered by some a symbol of our National Heritage may improve vegetative and soil conditions but would remove wild horse and burro viewing opportunities. In addition, although grazing is a recognized use in wilderness areas it still suggests to many users, man's presence and livestock are considered by many to be visually intrusive. Removing livestock from the sub-unit would eliminate this objectionable intrusion.

TABLE 3-14

IMPACTS ON RECREATION

Sub-Unit 1, High Rock

USES IMPACTED	IMPACT RATING*	IMPACTS
Sightseeing		
Landscape	+ H	Restoration of climax vegetation
Wildlife	+ M	Increased populations of deer, antelope, sage grouse, quail, chukar, and dove.
Archaeological Resources	+ H	Elimination of cattle trampling of sites.
Hunting and Backpacking	+ M	Improved visual quality. Improved campsite quality.
Wild Horses	- H	Recreational viewing use foregone.
Hunting		Increased game populations, but reduced vehicle access.
Deer	+ L	
Antelope	+ L	
Upland Game	+ L	
Off-Road Vehicles	- H	Closure of entire area to vehicle access except for High Rock Canyon Trail.
Rockhounding	- M	Same as for ORVs.

* H High
M Moderate
L Low

+ Positive
- Negative

Social and Economic Conditions

Both ranchers with permits in Sub-Unit 1 would be severely affected by the proposed action. The combination of the closure of this unit to livestock grazing with the proposed reductions in the other sub-units in which Bunyard and Earp run livestock would require each operator to purchase additional ranches if they are to continue ranching. It is likely that neither operator could withstand the proposal's economic impacts.

Bunyard

Bunyard uses forage in all four sub-units. With the loss of sheep-trailing access to his Massacre Ranch property and the loss of his lambing grounds in Sub-Unit 1, Bunyard's sheep operation could probably not be continued. Hence, the proposed use considers conversions in class of livestock from sheep to cattle.

Under the proposed action, Bunyard would be licensed for a maximum of 314 head of cattle in Sub-units 2, 3, and 4. However, average cattle numbers throughout the grazing season would be within Bunyard's present estimated herd size. Ranch adjustments would need to be made due to the changes in proposed seasons of use. Deeded and private ranch land holdings should be sufficient to adjust to the delayed turn-out dates.

Overall, the proposal would leave Bunyard with a relatively small cattle operation. The major impact of the proposal would be the loss of his sheep operation, which would represent a severe decline in Bunyard's wealth and income-generating ability.

Additional impacts of the proposal would affect Bunyard's 1,505-AUM winter sheep grazing permit on the Winnemucca District and his permit for 1,000 sheep for three weeks during the summer on the Modoc National Forest. The BLM Winnemucca District's range conservationist maintained that Bunyard's range is best suited for winter sheep use (Hines, 1978). Hence, this permit would have to be sold or exchanged for cattle use elsewhere in the Winnemucca District. The Forest Service was uncertain of the status of Bunyard's sheep permit if the proposal were adopted.

In summary, Bunyard's sheep operation could not be continued under the proposal. Bunyard could convert his major operation to cattle, but only with a high initial investment and probably lower net revenues.

Earp

Earp operates in Sub-Units 1, 2, and 3. Earp's present licensed use would be severely restricted under the proposal. The combination of the proposed actions in Management Areas 1 and 2E would cut most of the 2.5 months of early use (April 1-June 14) from Earp's permit. Overall, Earp's permitted use would be cut 69 percent, from 8,283 to 2,566 AUMs. To continue operating, Earp would have to develop additional feed sources yielding about 5,700 AUMs. A minimum of 1,000 acres of highly productive irrigated pasture would have to be obtained, representing an investment of about \$1 million. With this large an investment necessary, Earp could probably not operate a ranch of the size indicated by his present permit. The economic operation of Earp's investment in the livestock industry would probably not be feasible under the proposal.

SUB-UNIT 2, MASSACRE MOUNTAIN/NUT MOUNTAIN

Vegetation

Management Area 2A

Vegetative Condition and Trend: This area would show noticeable improvement in range condition within 20 years (TABLE 3-5).

Season-long grazing once every three years would satisfy the growth requirements of most species. The beneficial effects of livestock trampling would not be maximized since livestock use would begin prior to seedripeness and seed stalks might be grazed before seed is produced. Growth of aspen and willow sprouts would be retarded by grazing but a net increase in these species would be anticipated. Low sagebrush associations would improve to "good" condition and big sagebrush associations would be in "fair" condition. Increases in Sandberg bluegrass, squirreltail, and bluebunch wheatgrass would occur. The bitterbrush association would improve to "good" condition and would show noticeable increases in Idaho fescue and bitterbrush.

Vegetative Production: Deferring livestock grazing until June 15 one year in three and completely resting the area the other two years will allow vegetative production to initially increase by approximately 28 percent (Hormay, 1970). Production will initially increase from 1,246 AUMs to 1,595 AUMs. Anticipated improvement in range conditions over a 20 year period will allow forage production to increase to approximately 5,600 AUMs.

Management Area 2B

Vegetative Condition and Trend: Prescribed grazing on this area would have maximum benefits for vegetation. Grazing can be prescribed as necessary to promote the beneficial impacts derived from proper grazing use. This may include trampling grasses after seedripeness, hedging bitterbrush to keep it in a desirable form class, or periodically grazing meadows to increase the availability of succulent forbs and grasses for wildlife. To maintain many ranges in their most productive capacity, grazing is necessary (Cosby, 1975; Reardon and Merrill, 1976). Plants reproducing from seed are more effectively established by having seeds scattered and trampled (planted) with animals after seed maturity. Trampling tends to cover the seed and seedling roots are deeper in the ground and nearer more persistent ground moisture. Hoof prints also collect precipitation (Jardine, 1915; Raguse et al., 1977; Sampson, 1914). Grazing also induces reproduction in many vegetative reproducing plants (Heady, 1975). Grazing of shrubs often encourages twig growth at the expense of flowers and fruits in following years (Stoddart et al., 1975; Garrison, 1972). It would be anticipated that most of this area would be in "good" condition in 20 years.

Vegetative Production: Removal of livestock grazing will provide an initial increase in forage production of approximately 28 percent (Hormay, 1970). This increased production occurs because livestock are not removing vegetative growth during the growing season and consequently total vegetative production increases. Initially, forage production will increase from the present 1,129 AUMs to 1,445 AUMs.

As range condition improves, the forage production of individual site increases. By using Anderson's (1978) stocking rate guides, it was determined that forage production would increase by 190 percent. In 20 years, forage production will increase to approximately 4,263 AUMs.

Management Area 2C

Vegetative Condition and Trend: Most of this area would show improvement within 20 years (TABLE 3-5). The four-pasture grazing system would satisfy the growth requirements of most species because it provides three years growing season rest for grasses and forbs and alternate year rest for browse species (See discussion of rest treatments in the general section). The beneficial impact of livestock seed trampling would be achieved and the response of most ecological sites would be hastened. A small area of greasewood/basin wildrye adjacent to Massacre Lake would not be expected to demonstrate noticeable improvement. The remainder of the area would show significant response and would be in "fair" or "good" condition in 20 years.

Vegetative Production: Implementation of the proposed grazing system will increase forage production. Delaying livestock turnout dates until May 15 will provide approximately 23 percent more forage to be produced in the early use pasture (Hormay, 1970). Deferring grazing use until seedripe in another pasture and completely resting the remaining two pastures will provide approximately 28 percent additional forage in these pastures (Hormay, 1970). This increased production occurs because livestock remove less forage during the growing season than presently occurs and consequently, total vegetative production increases. The initial forage production will increase from approximately 1,625 AUMs to 2,084 AUMs. As range condition improves, the forage production of individual sites will increase. In 20 years, forage production will increase to approximately 6,100 AUMs.

Management Area 2D

Vegetative Condition and Trend: Vegetative conditions would improve less noticeably on this area than on surrounding areas. This area is composed of a high percentage of the greasewood/basin wildrye site which would not be expected to improve noticeably under no-grazing conditions (see discussion of ecological sites APPENDIX J). The majority of this area would still be in "poor" or "fair" condition in 20 years (TABLE 3-5).

Vegetative Production: Removal of livestock grazing will increase initial forage production by approximately 28 percent (Hormay, 1970). Initial forage production will increase from the present 435 AUMs to 557 AUMs. As range condition improves it is estimated that the forage production will increase to approximately 1,000 AUMs.

Management Area 2E

Vegetative Condition and Trend: This area would improve noticeably within 20 years. The grazing system proposed for this area would have near-maximum vegetative benefits. Turning out on June 15, limiting livestock utilization to 30 percent, and providing grasses and forbs growing season rest three out of four years will satisfy plant growth requirements. Bitterbrush, an important browse species, would receive substantial growing season rest and would be expected to show an increase in vigor. Seedling establishment is generally not expected (Plummer et al, 1978). There is also a possibility that stand stagnation could occur as cattle use decreases (Tueller and Tower, 1978). The grazing systems that were cited in the general vegetation section all had less rest than that proposed in this area and all experienced satisfactory vegetative improvement. Vegetative recovery would primarily be as described for Area 2C and in the discussion of ecological sites (APPENDIX J). Most of this area would be in "good" condition in 20 years (TABLE 3-5).

Vegetative Production: Implementation of the proposed grazing system will increase forage production. Delaying livestock turnout dates until June 15 will provide about 28 percent forage increase in the early use pasture (Hormay, 1970). Deferring grazing use until seedripe in another pasture and allowing the remaining two pastures to be completely rested will also provide a 28 percent forage increase (Hormay, 1970). Initial forage production will increase from 15,453 AUMs to 19,780 AUMs. As range condition improves, the forage production in 20 years will be approximately 43,000 AUMs.

Livestock Grazing

Management Area 2A

Adverse impacts on livestock operators would result from later turnout dates and decreased livestock use (TABLE 2-9). Grazing once every three years would force operators to acquire forage elsewhere during rest years. Even if a rotation grazing system were developed in conjunction with the Sheldon Antelope Refuge to provide forage for at least one of the years, there would still be a substantial initial reduction in livestock use.

With improved range conditions and production of additional forage, approximately 80 percent of the initial livestock reductions during the use year would be recovered. Use, however, would still occur during one out of every three years.

Increased forage availability and quality, resulting from light use and improved range conditions, would result in improved animal nutrition. More cows would conceive, increasing calf crops. Cows would breed within a shorter time period, resulting in an earlier, more uniform calf crop. Correspondingly, heavier weaning weights would result. Improved nutrition would also promote lactation, growth, and fattening processes, thereby contributing to heavier cows and calves.

Proposed stock water developments would improve livestock performance by reducing the trailing distance to water. Livestock would expend less energy trailing and would be more efficient in converting forage to growth processes. Additional water sources would also result in better livestock distribution and more uniform forage utilization.

Management Area 2B

Prescribed grazing would have near maximum adverse impact on livestock operators. Grazing would be allowed so infrequently that an operator could not rely on this area for any major contribution to his operation. Therefore, prescribed grazing would have virtually the same impacts as no grazing (TABLE 2-9).

Management Area 2C

Later turnout dates and decreased livestock use would have short-term adverse economic impacts on operators using this area. In 20 years, however, use would be anticipated to increase above present levels (TABLE 2-9).

Livestock benefits from improved animal nutrition would generally be as described for Area 2A. Weaning weights would be slightly lower than with light grazing. As grazing pressure increases, livestock would tend to utilize less-preferred forage species.

Management Area 2D

Elimination of livestock grazing would have maximum adverse impacts on livestock operators (TABLE 2-9). These impacts are discussed under "Social and Economic Conditions," below.

Management Area 2E

Later turnout dates and decreased livestock use would have short-term adverse impacts on these operators. Use within 20 years however, should increase above present levels (TABLE 2-9).

Benefits to livestock from improved animal nutrition would correspond to those in Area 2A.

Several area-specific factors would create additional impacts. The proposal would require that existing allotments be used as pastures. This would result in congregating of livestock which have traditionally been dispersed. Crossbreeding by bulls of different breeds, blood lines, and/or quality could affect livestock production. The likelihood of transmission of diseases would also increase. At the end of the grazing season, additional time would be necessary to separate livestock into separate herds. Combining several livestock herds would require the Weber operation to change from its current fall calving operation to a spring calving operation to conform with other livestock operators in this area.

Implementing a new grazing system requiring livestock to be moved into unfamiliar areas would have short-term adverse impacts on livestock production. Livestock disorientation plus anticipated herding to acclimate livestock to new grazing routines would produce lighter weaning weights for a 2-3 year period.

Since new fences would not be constructed to hold livestock in pastures, livestock herding time would be increased to keep livestock in proper areas.

Wildlife

Management Area 2A

All habitat types and attendant species would benefit from increases in forage and habitat condition would improve. Deer would have the potential to increase from 100 to 150 animals, antelope would increase from 50 to 100 animals, and sage grouse numbers would increase. Nongame wildlife would show variable changes.

Deer: Starting grazing June 15 and terminating grazing after 30-percent utilization of bitterbrush would reduce forage competition between deer and livestock by 100 percent during spring and by 45 percent during summer. It would also ensure 60 percent of annual browse growth would be available for fall/winter deer use.

About 100 deer would have improved forage quantity year-round resulting in improved physical condition, improved fawn survival, and reduced mortality rates. About 6,100 acres of bitterbrush would improve in vigor due to a 40-percent decrease in utilization during late summer and fall when carbohydrate reserves are being accumulated.

Antelope: Fifty antelope would be similarly impacted. Elimination of spring competition between cattle and antelope for forbs would be beneficial, and provision of bitterbrush forage during summer would eliminate the other competitive forage factor between cattle and antelope. Campbell (1970) found that antelope withdrew from a Montana range used by sheep but readily shared range with cattle; therefore it would be likely that antelope in this management area would not be adversely impacted by the presence of cattle. Antelope would benefit from the removal of the two major competitive factors and would show an increase to 100 animals in 20 years.

Sage grouse: Sage grouse would be beneficially impacted by elimination of nest trampling and nest disturbance. Forbs would be available without livestock competition. Forbs are the major plant food for chicks (Klebenow and Gray, 1967). Meadows would provide maximum season-long cover on two-thirds of the area plus the fenced meadows in the use pasture. The remaining one-third of the area would receive livestock use from the time of turnout to the end of the grazing season. Fencing one-half of the meadow areas guarantees that 50 percent of the habitat would remain undisturbed.

Chukar: Chukar would not be significantly affected.

Nongame Species: Nongame habitat structure would improve by reducing the amount of vegetation removed by 3,270,000 pounds over a three-year grazing cycle. A 50-60 percent increase in residual vegetation would be expected. Unaltered habitat structure would be available until June 15; by then most nongame birds will have nested. Nest disturbance or destruction would be nearly eliminated. Termination of grazing with 60-80 percent of vegetation remaining would provide improved habitat conditions in all ecological sites. Raptors would remain stable with little significant effect resulting from changes in prey base.

Two years of rest from grazing would provide good habitat conditions for most species. Total elimination of wildlife-livestock forage competition, cover removal, and livestock-associated disturbance would result in beneficial impacts on all ecological sites.

Meadow Habitat: Meadows would achieve about 70 percent of site potential. Small-mammal species richness would decrease. Bird use would increase and species occurrence would change. Sage grouse, red-winged blackbirds, and savannah sparrows would become the most abundant species on meadows, replacing Brewer's sparrows, sage sparrows, and Brewer's blackbirds as the dominant species.

Aspen Habitat: Aspen stand condition would improve, increasing the height of the lower and middle vegetation layers. An estimated 75 percent of climax vegetation would result. Small-mammal species richness may not change but shrews and voles would probably replace pocket mice and kangaroo rats in the composition. Robins, house wrens, and scrub jays would be replaced by hummingbirds, warblers, and fox sparrows as the most abundant species with total bird numbers increasing significantly.

Fenced aspen stands would reach near-climax habitat structure.

Range Facilities: Development of six springs would have little impact on wildlife. Removal of four miles of fence would reduce the current fence hazard to wildlife by 40 percent. Fencing of meadows and aspen stands with three miles of new fence would create a minor hazard for large mammals, no hazard for small mammals, and improved perches for small birds.

Management Area 2B

Wildlife would be provided habitat without livestock competition. A 50-percent increase in forage availability and a 100-percent increase in cover would result. An upper stratum of grass vegetation about 20 inches (53 cm) high would be added to the habitat.

About 50-75 antelope and deer would benefit from elimination of competition for forage, cover, space, and water. Forage to sustain a 50 percent increase in deer and antelope numbers would result. Sage grouse would benefit from the improved condition of meadows, elimination of nest disturbance and destruction, and improved cover conditions.

Since livestock would be managed to improve habitat condition through periodic and selective timing as well as degree of grazing use, the proposal would be beneficial throughout its application. Impacts would vary by grazing management prescription. However, this management system would offer the greatest potential for using grazing to maintain and improve habitat in a highly selective and site-specific manner.

Removal of four miles of pasture fence would eliminate potential risk to deer and antelope. Other species would not be significantly impacted.

Numbers of nongame bird species preferring open habitat, such as robins, would decrease and meadowlarks and vesper sparrow numbers would increase. Small-mammal populations would increase.

Raptor populations would remain stable with little significant effect resulting from changes in prey base or impacts on nesting areas.

Management Area 2C

Resting 50 percent of the range and establishing later turnout dates, moderate-use limit, shorter season of use, and livestock reductions would improve habitat condition for most species.

Habitat would be improved and stabilized in "good" ecological condition. Forage and cover would increase and habitat structure would return to 50-75 percent of climax in most habitats. Moderate grazing use would continue to have vegetative impacts especially on small mammals, but these impacts would be slight because of improvement in overall habitat condition. Deer, antelope, and sage grouse numbers would increase. Nongame response would be mixed but largely beneficial, since habitats would improve in condition and tend to become more distinct, providing greater edge effect and, supporting fewer invader species and more indigenous species. Little change in golden eagle or prairie falcon populations would be expected, though impacts would be beneficial.

Resting 50 percent of the range each year would provide mobile wildlife species with half the habitat in an ungrazed condition. Allowing grazing after seed-ripe in one pasture would result in 75 percent of the habitat being free from the effects of grazing through the spring and early summer period. Use of one pasture from May 15 until mid-August would result in removal of half of the forage and cover during spring and early summer on 25 percent of the range. This would be a 75-percent reduction from current grazing impacts. Grazing a second pasture from August to September would result in some forage competition and reduction of cover on another 25 percent of the area. Impacts of both grazing treatments would be reduced by moderate-use limitations. In each grazed pasture 40-60 percent of all vegetation would be left for wildlife forage and cover. Reducing the length of the grazing season by two months would reduce the duration of grazing by 30 percent, resulting in a one-third reduction in the amount of time cattle would concentrate on meadows.

Although deer would benefit deer habitat is limited and resultant benefit to the overall deer population would be insignificant.

Antelope would benefit from a 75-percent increase in habitat free of livestock competition. Forbs would be available in spring without competition in all but one pasture. On that one grazed pasture some competition for forbs could occur between livestock and antelope but would be minimized due to later turnout and moderate use limits. The addition of two miles of gap fence would have insignificant impacts due to their rimrock location. No significant impacts on winter antelope use would be expected. Antelope habitat would improve so that it would support a 50 percent increase in numbers.

Sage grouse would be beneficially impacted. Sage grouse production would be improved by increased cover on 75 percent of the area during nesting, and availability of ungrazed meadow habitat. Grazing after August 15 would have insignificant impact on sage grouse except in meadow areas. Providing two years of rest after grazing would enable meadows to improve in condition and maintain a vegetation density less than climax but highly suitable for sage grouse.

In low sagebrush areas nongame species would generally respond as discussed for Management Area 2A since both management areas would be provided two years of rest after grazing. Some bird nesting disturbance would occur on the spring use pasture but would be much less than is occurring now. Cover would be reduced, subjecting small mammals to increased predation in the graze and seed-ripe pastures. This impact would be adverse for small mammals but beneficial for predators.

In the greasewood/basin wildrye and the big sage/basin wildrye areas near Massacre Lake habitat improvement would be very slow but response would be better than under systems with no seed trampling treatment. Proposed grazing management would cause some changes in species occurrence and relative abundance. Small-mammal composition would slowly change

with kangaroo rats and deer mice declining in species composition but increasing in numbers. Pocket mice and harvest mice would increase. Improved stands of basin wildrye would be responsible for most nongame species changes. Bird-use changes would not be definitive.

Management Area 2D

This 8,000-acre area has roughly equal amounts of greasewood and big sagebrush associations. Elimination of grazing on these associations would yield some benefit to wildlife though impacts on deer and antelope would be insignificant because they rarely occur in Area 2D.

In the greasewood association, habitat change would be very slow to non-responsive. Impacts on wildlife would be insignificant.

Habitat structure and diversity would improve in some of the big sagebrush ecological sites. More vegetative layering would occur with an increase in variety of grasses and forbs in the middle stratum. Bird and small-mammal responses would be the same as expected in Sub-Unit 1.

Sage grouse would benefit from improved cover and meadow condition resulting from elimination of livestock-related disturbance and competition.

Prey changes would benefit raptors. However, significant increases in raptor populations would not be expected.

Management Area 2E

This area supports about 150 antelope and 375 deer which were thought to migrate to this area from the Sheldon Antelope Refuge complex. However, recent radio-tracking data indicate deer may not migrate from the Sheldon to Cowhead/Massacre as originally thought (Burkhart, pers. comm.) As habitat conditions improve antelope numbers would be expected to increase to 350 and deer to 550. Forage would improve in quantity and quality in all seasons. Sage grouse would also increase as a response to improved habitat, especially on 450 acres of meadow. Other game and nongame species would benefit from increased forage and cover and from decreased disturbance from livestock during spring when nesting and rearing of young occurs.

Game Species

Deer: Forage competition between deer and livestock would be reduced by over 75 percent. No competition would occur on half the range and less than half of current competition would occur on the remaining half due to a light-use limit on bitterbrush, the preferred browse species. Berg (1966) and Tueller and Monroe (1974) found competition intense between livestock and deer in the nearby Bare Allotment (Home Camp Planning Unit). According to Berg, livestock consumed all available bitterbrush and mountain mahogany after all grass had been eaten. Browse transects indicate similar conditions exist on 16,000 acres of this area. Removal of most competition would allow an improvement in individual animal condition and in population productivity.

Where grass and browse are available livestock prefer grass until mid-summer when protein content of grass decreases and browse protein content remains high. At this time livestock make heavy use of browse. Heavy livestock grazing reduces browse vigor and leaves little forage for winter deer use. Limiting bitterbrush use to 20-40 percent of annual growth would assure that browse would be available in all pastures. Light use by cattle followed by two years of rest would improve plant vigor and stimulate forage production. Bitterbrush has been found to stagnate following one to five years rest, depending upon condition of the stand prior to removal of livestock, and intensity of remaining deer use (Tueller and Tower 1979). Tower (1976) also determined that bitterbrush stagnated from five years of no grazing and that bitterbrush produced 25 percent more forage when clipped. Moderate use of bitterbrush increases forage quantity. Light use by livestock followed by wildlife use would be expected to result in overall moderate use of bitterbrush.

Trlica, et al. (1977), determined that a 14-26 month rest period was insufficient for bitterbrush to recover full vigor from 90 percent defoliation. Whether two years of rest is adequate to restore full vigor following 40-50 percent defoliation is uncertain. Reduced utilization of bitterbrush by livestock and two years of rest would improve plant vigor and browse quality to an unknown degree.

Forage diversity would increase as a result of delaying the start of grazing from April 15 to June 15. Forbs and grasses normally consumed by cattle in April and May would be available to deer. Succulent meadow forage would be available in the rest pastures and in fenced meadows. Sufficient spring forage would improve animal condition. Improvement in the condition of does during April, May, and June (the last three months of pregnancy) would result in healthier fawns and higher rates of fawn survival.

Most existing water sources provide sufficient water for deer. Additional wells would increase water distribution but would not significantly affect deer.

Antelope: Wentland (1968) and Bayless (1969) found that browse, mostly sagebrush, made up at least 80 percent of the winter diets of pronghorns. Abundant sagebrush is available on pronghorn range in this management area; impacts from this proposal would not significantly alter sagebrush availability. Baker (1953) and Beale and Smith (1970) found that forbs represented 86 percent or more of pronghorn diets during summer. Nevada Department of Fish and Game (1978) indicates both forbs and bitterbrush are important to antelope's summer diet. Under the proposal, forbs would be available for antelope without competition until June 15. Then livestock would compete for forbs on 25 percent of the area although food habit overlaps between livestock and antelope is generally low. After August 15 another 25 percent of the area would be available to cattle. Forage competition in spring and summer would be reduced by 75 percent by decreasing the season of use by 2.5 months, limiting forage consumption to light use, and allowing grazing on only half the area. Up to 60 percent more bitterbrush forage would be provided by limiting

forage consumption to light use and keying utilization to bitterbrush. Currently, forage is thought to be one of the limiting factor in pronghorn populations; the proposal would increase forage availability by 50 percent in this management area.

Pronghorn characteristically move in response to the need for succulent forage and water. The proposed eight miles of exterior pasture fence and five miles of protective meadow fence would be expected to have an adverse impact on antelope mobility though impacts would be much less severe than in Wyoming where most of the fence-antelope studies have been conducted. Cowhead/Massacre has nowhere near the antelope numbers nor the severity of winters that occur in Wyoming. Fence design would minimize but not eliminate the impacts. Development of 25 dispersed water sources would shorten the distance antelope would have to travel for water, and result in a beneficial impact.

Providing up to one-half of all meadows in an ungrazed condition would provide antelope with 225 acres of ungrazed succulent forage.

Sage Grouse: Sage grouse would benefit from the proposed grazing system because of an increase in available forbs and an increase in nesting cover.

Sage grouse depend almost entirely upon sagebrush for food from October to April each year. Savage (1969) and Oakleaf (1971), working in this area of Nevada, found that in May sage grouse change from a sagebrush diet to a diet dominated by forbs. In September they shift back to sagebrush as forbs become unavailable. Juvenile sage grouse consume about 75 percent forbs until they are about three months old (Peterson, 1970; Savage, 1969). An absence of forbs therefore reduces survival of young birds.

Grazing one of four pastures after mid-August would provide available forbs for sage grouse, antelope, and deer in all pastures. Grazing the fourth pasture in mid-June would have a negative impact on sage grouse. Fencing 225 acres of meadows would insure that half of the most productive habitat areas are free of competition for forbs throughout the summer. Sage grouse would have increased summer forage and higher chick survival. Winter forage is not considered a limiting factor.

Sage grouse nest under sagebrush on the open range. Reduction in the geographic extent and in intensity of grazing would increase ground cover which would make the birds less vulnerable to nest predators and decrease the incidence of nest disturbance. A 75-percent reduction in disturbance is assumed based on the area deferred and rested from grazing during sage grouse nesting. Increased nesting success and improved forb availability for chicks and adults would result in a population increase due to increased production and survival of young.

Chukar: This action would not significantly affect chukar.

Quail: Protection of water sources and fencing of meadows would beneficially impact quail. Quail depend on water and dense shrubs for escape and roosting cover. Impacts would be slight because so little habitat is involved.

Nongame Species: Increased vegetative food and cover resulting from light use and frequent rest would have a beneficial impact on most nongame wildlife.

Cover would be maximized in the rested pastures and increased significantly in the grazed pastures. Reproductive success of species requiring additional cover would increase.

Raptors would have a greater prey base, but prey would have increased cover. Thus, little significant change in raptor numbers would be expected.

Wild Horses

Management Area 2A

Wild horse numbers would be reduced from 50 to 37.

The proposal would benefit the 37 wild horses within this area. Improvement in range conditions coupled with light livestock use, later turnout dates, and two consecutive years of rest following livestock use would ensure availability of sufficient desirable forage for horses.

The removal of seven miles of pasture fence currently impeding wild horse movement would allow horses to drift freely between higher summer ranges and lower winter ranges.

Three miles of proposed fencing around aspen stands and meadows would have a slight detrimental impact on wild horses. Horses might inadvertently run into fences they are unaccustomed to. This impact would be greatly reduced within one year following installation of fences. No deaths would be anticipated.

Management Area 2B

Wild horses would be reduced from 48 to 33.

Prescribed grazing on this area would benefit wild horses by improving vegetative conditions. It is assumed that livestock grazing would not be prescribed in areas which would result in forage shortages for horses. The removal of four miles of pasture fence would result in the same beneficial impacts described previously for Area 2A.

Management Area 2C

Wild horse numbers would be reduced from 58 to 29.

The proposal would primarily be beneficial to wild horses which would remain in this area. Effects of improved range condition would generally be as described previously.

The development of additional stock watering facilities would improve wild horse distribution and provide additional water in dry years.

Moderate-use limitations, later turnout dates, and periodic livestock rest would ensure adequate forage availability for horses.

Two miles of gap fencing could have adverse impacts on wild horse movement.

Management Area 2D

Any wild horses will be removed.

Management Area 2E

Wild horse numbers would be reduced from 212 to 106 head.

The proposal would primarily be beneficial to wild horses remaining in this area. Beneficial effects of improved range conditions would be as previously described. Light-use limitations, later turnout dates, and periodic rest would ensure adequate forage for horses. The development of additional stock water would have beneficial impacts as described in Area 2C.

Five miles of fencing around sensitive habitats would be detrimental. Impacts would be as described in Area 2A.

Cultural Resources

In each of the management areas within this culturally sensitive sub-unit, the proposed action would either substantially reduce the intensity of livestock-related impacts or would eliminate them entirely.

Management Area 2A

A 78-percent reduction in overall livestock use would reduce animal pressures on archaeological sites to their lowest level since the inception of the historic grazing regime. The benefits to the range ecosystem of two years of rest would be shared by cultural sites throughout the area, although a reduced, gradual (but irretrievable) attrition would continue to deplete the information content of sites located where livestock congregate. Fencing 50 percent of the meadows would reduce this impact but the magnitude of the reduction could not be quantified until specific grazing exclusions are advanced. Four hundred sites are predicted to lie within the area of potentially reduced impact; one known site of National Register quality would continue to receive more concentrated grazing impacts.

Management Area 2B

Prescribed grazing implies that livestock would be allowed to graze only when, and to the extent that, management goals would be advanced. As grazing prescriptions would be written to avoid disturbance of significant archaeological areas, and as the prescribed grazing would be implemented only after an eight-year interregnum (during which cultural resource management plans could be prepared in support of the second land-use goal for the sub-unit), the full range of approximately 500 predicted sites (including four places of known National Register quality) would benefit from reduced or eliminated livestock-related impacts.

Management Area 2C

A 57-percent reduction in livestock use under this existing AMP would result in reduced animal pressures on most of the approximately 700 archaeological sites predicted to lie within the area, although _____ known sites (including one of National Register quality) occur where livestock are likely to congregate and would continue to receive substantial, though reduced, adverse impacts.

Management Area 2D

The proposed action would be entirely beneficial to archaeological and historic sites within this area. Termination of grazing would eliminate presently severe, direct, animal-related impacts; reduction of erosion and restoration of native biotic communities would enhance the integrity of setting of all sites. Benefits would be shared by approximately 100 sites predicted to lie within the area, as well as by three presently known archaeological districts (complexes of sites) believed to be eligible for inclusion on the National Register. No adverse impacts would be predicted.

Management Area 2E

The proposed 57-percent reduction in livestock use would substantially reduce present animal pressures on open sites, although concentration would continue to occur at water sources. Fencing of up to 50 percent of the meadows would reduce the impact by a presently unquantifiable amount. Two archaeological sites, believed eligible for the National Register, occur at places of probable concentration and would continue (unless fenced) to receive reduced but irreversible adverse impacts.

Recreation

Impacts of the proposed action on recreation are summarized in TABLE 3-15.

Wilderness

Sub-Unit 2 contains portions of two WSA's and one roadless area recommended for WSA status. On the whole, decreasing livestock grazing and shortening the season of use would benefit wilderness resources. Vegetation conditions would improve, and trampling of archaeological sites would be lessened.

TABLE 3-15

Impacts on Recreation
Sub-Unit 2, Massacre Mountain/Nut Mountain

MANAGEMENT AREA(S)	USES IMPACTED	IMPACT RATING	IMPACTS
A, B, C	Hunting		
	Deer	+ M	Increased game populations
	Antelope	+ M	Increased game populations
	Upland Game	+ M	Increased game populations
D	Archaeological	+ M	Protection of artifacts by livestock exclusion fence
E	Sightseeing		
	Landscape	+ L	Increased natural vegetation cover
	Wild Horses		
	Wildlife	+ L	Increased wildlife populations for public viewing
	Hunting		
	Deer	+ M	Increased game populations
	Antelope	+ M	Increased game populations
	Upland Game	+ M	Increased game populations

Increased forage availability for wildlife would enhance hunting and wildlife viewing opportunities. Eliminating grazing from Management Area 2B except on prescription basis would have particularly high benefit to vegetation and wildlife. Although some benefits from removing livestock from Management Area 2D would occur, particularly from lessening impacts on archaeological resources, construction of an enclosure fence would add another visual intrusion to the Massacre Rim WSA, and removing wild horses, though benefiting vegetation, soils and archaeological resources, would remove wild horse viewing opportunities.

Social And Economic Conditions

Nine operators use this sub-unit. Two of them, Bunyard and Earp, are discussed under Sub-Unit 1.

The proposed action would severely affect the ranchers in Sub-Unit 2. Turnout dates would be delayed four to eight weeks for all nine of the permittees. Reductions in permitted AUMs would range from 38 to 100 percent. Overlap in seasons of use with the Sheldon Antelope Refuge would alter the operations of three of the operators. The six ranchers operating in Management Area 2E would face extra labor costs of up to two weeks as a result of running in common with other operators. The two permittees in the Board Corral Allotment would face two out of three years of complete non-use in their area. Additional costs, that cannot be quantified at this time, include increased medical costs and calf mortality due to keeping spring calves on private pasture for a longer time, extra herding expenses due to the proposed four-pasture grazing systems, and higher per-cow operating costs due to the reductions in permitted numbers.

As noted earlier, definitive statements regarding the continued operation of an individual ranch under the proposal are impossible with the available data. However, the severity of the proposal upon the present operations in Sub-Unit 2 would be so great that at least four ranchers would be forced out of business. Substantial changes in cattle and ranch management would be necessary for all except one of the ranchers if they were to stay in the business.

Coops

The development of additional pastureland would appear to be Coops' only feasible response to the proposal. Pasture would have to be developed for about 322 head from April 16 to June 14 and for an average of about 132 head for the remainder of the season. At a stocking rate of six AUMs per acre, 185 acres of irrigated pasture could handle the foregone public land grazing. This would require an investment of about \$180,000 and add about \$20,000 in annual interest and operating expenses, in addition to increased per-cow labor costs on the public lands induced by the proposal.

It would be doubtful that Coops could continue his planning unit ranching operation under the proposal.

Hill

Two out of three years of non-use on Area 2A would effectively close out the usefulness of Hill's leased permit.

Heryford

Heryford operates in Sub-Units 2 and 3. The proposal would eliminate most of Heryford's present use in Area 2E (Wall Canyon) which occurs before June 15, when the cattle are moved onto the Sheldon Refuge. The proposed June 15 turnout of about 100 head in Area 2E, combined with the proposed use of Area 3A, would require finding additional spring feed for 816 AUMs. Private flood meadows could be used as pasture during the spring, but the replacement feed costs for the hay thus lost would add about \$18,500 to Heryford's annual operating costs.

Since all of Heryford's cattle in the Wall Canyon Allotment are moved onto the Sheldon Refuge on June 15, the potential use of this area under the proposal might be limited to yearlings. About 168 yearlings could be run on the public lands after June 15 under the proposal. However, any savings from using the cheaper Federal range would probably be offset by the increased costs of keeping these yearlings on private pasture or feed until the June 15 turnout date and by the increased per-cow costs due to running so few head in Area 2E.

Substantial changes in Heryford's operation would be necessary if it were to remain a viable business.

Hussa

Hussa would encounter problems similar to those facing Heryford and Weber. Most of Hussa's present use occurs before June 15, when he, Heryford, and Weber move their cattle onto the Sheldon Refuge. The proposal would require that Hussa find additional feed for 448 head from April 16-30 and for 644 head from May 1 to June 15.

Cash cost increases resulting from the proposal, net of the reduced grazing fees, would be about \$25,000 for lost hay production from pasturing the cattle on his meadowlands during the spring.

The continued economic operation of Hussa's ranch would require significant changes in his present management.

Marx

The proposal would severely reduce Marx's present use of the Massacre Lake Allotment, an area under a signed AMP. Marx would face a reduction of 223 cattle and a change in season of use. Replacement feed sources might include hay feeding for the cattle going onto the public lands on May 15 and irrigated pasture development for the reduction in numbers. Such a response would require an initial investment of about \$200,000 and would increase Marx's annual cash costs, net of the reduction in grazing fees, by about \$32,000.

Marx's present operation would be severely affected by the proposal.

Joe Parman

Joe Parman obtains forage from Sub-Units 2 and 3. During the two out of three years of non-use in Area 2A, Parman's operation would be severely limited by the proposal. Two privately owned parcels of land at Sand Creek and at Board Corral could accommodate a maximum of 55 cow-calf pairs (Parman, 1978). Parman would still need to find pasture for an average of 85 head from April 15 to October 15, in addition to the replacement heifers currently pastured on his Sand Creek field. Purchase of additional pasture would be one of the most feasible responses to the proposal. This option, however, would require an investment of about \$75,000, and would add about \$7,500 in annual interest and operating costs.

During use years in Area 2A, Parman could turn out about 100 head from June 1 to September 30. The benefits of this proposed use for Area 2A might be provision of a year of light use or complete rest for his deeded lands or, during years of good cattle prices, holding some of his calves for sale as long yearlings. This latter action might increase his net returns over cash costs by about \$3,200. However, this increase in returns every one out of three years is insignificant when compared to the cost increases cited above.

Parman's operation would be severely affected financially by the proposal.

Weber

The proposal would have a devastating effect upon Weber's Surprise Valley based ranch. The proposed action would delay the bulk of Weber's turnout by two months, until June 15. About 85 head could be turned out in Area 2C (a signed AMP area) on May 15 and an extra 615 head could be turned out in Area 2E on June 15. In order to continue operating with the herd size necessary to cover his fixed costs (including debt servicing), Weber would have to develop additional feed sources yielding about 4,900 AUMs. Even with highly productive irrigated pasture, Weber would have to purchase and develop about 815 acres. This would represent an investment of about \$750,000, and add about \$80,000 to annual interest and operating expenses.

Weber could not continue his Surprise Valley operation under the proposal and the continued economic operation of his Alturas ranch would be questionable.

Vegetation

Management Area 3A

Vegetative Condition and Trend: Range improvement within this area would be variable (TABLE 3-5). A large area adjacent to the dry lakebeds in Surprise Valley, composed primarily of the shadscale/Indian ricegrass site, would not show improvement. In addition, that portion of the big sagebrush/bluebunch wheatgrass-Indian ricegrass site that would not be seeded would remain in fair condition. (See discussion of ecological sites, APPENDIX J.) The remainder of the area would show favorable response and would be in "fair" or "good" condition after 20 years. Vegetative response would be similar to that described for Area 2C.

Plowing and seeding which would occur on the big sagebrush/bluebunch wheatgrass and the big sagebrush/bluebunch wheatgrass-Indian ricegrass sites, would affect 10,000 acres within this area. Existing vegetation, primarily big sagebrush, would be destroyed through plowing and a mixture of grasses, forbs, and shrubs would be seeded. If seedings are successful, the vegetative community would be dominated by grasses with lesser amounts of forbs and shrubs.

Success of seedings depends largely upon weather conditions immediately preceding and following the seeding. If soil moisture is sufficient, the success of seeded species would be expected to be great. If soil moisture conditions are unfavorable, cheatgrass would likely dominate the community initially. Sagebrush and rabbitbrush would become established in later years. The technique proposed for seeding has been successfully practiced throughout Nevada (Summerfield, 1978, pers. communication) and was used on the adjacent Wall Canyon seeding. Since seeding sites within this area occur on the same ecological site as the Wall Canyon seeding it is anticipated that seeding success as well as vegetative production will be similar. It is estimated that chances for successful seedings exceed 90 percent.

Because seedings would be grazed each year during spring months, it would be anticipated that the vigor and density of perennial grasses and forbs would not be maintained and rabbitbrush and sagebrush would invade. Sharp (1970) found that close cropping of crested wheatgrass for a number of years during the growing season causes a reduction in plant size, a decrease in the number of plants, and a less uniform distribution of plants. Heavy intensity grazing causes the plants to fragment and an apparent larger number of plants per unit area occurs after a few years. As close cropping continues the stand becomes less dense and less uniform in distribution. He also reported that a stand of crested wheatgrass may persist for more than 15 years under continuous heavy spring grazing. The experimental area used for these studies, however, received the majority of its precipitation during the growing season so the longevity of seedings grazed under these conditions in the study area is anticipated to be somewhat shorter. It is anticipated that the proposed seedings will still be evident in 20 years but plant vigor will be low and sagebrush and rabbitbrush will have reinvaded the sites.

Vegetative Production: Implementation of grazing systems and seeding projects will significantly increase the production of this area. Studies conducted by Hormay (1970) indicated that by delaying turnout until May 15 there will be approximately 23 percent increase in forage production in the early use pasture. Pastures completely rested and the pasture deferred until seedripeness will experience approximately 28 percent increase in forage production. Therefore, the initial forage production of the native range will increase from 4,850 AUMs to 5,960 AUMs. As range condition improves, it is estimated that the forage production of the native range will increase to approximately 15,000 AUMs.

Based on the production of seedlings developed on similar sites in the Massacre Lake and Wall Canyon Allotments it is estimated that the production of the seeded area will increase from approximately 42 acres per AUM to four acres per AUM. Present production was determined using Anderson's 1978 stocking rate guides. Production on 10,000 acres would increase from approximately 240 AUMs to 2,500 AUMs. Since the seedlings are expected to exhibit downward trends under annual spring grazing the capacity in 20 years is expected to be approximately 1,250 AUMs.

Management Area 3B

Vegetation Condition and Trend: Fall grazing would have near maximum benefit on grass and forb species but would cause detrimental impacts on willows, bitterbrush, and other shrubs. Fall grazing of grasses allows for increased reproduction, seed trampling, and vigor (Hormay, 1970). The response of the big sagebrush/basin wildrye and greasewood/basin wildrye sites, which comprise approximately 60 percent of the area, would depend upon the abundance of remaining basin wildrye plants. Although few remnants were encountered during sampling, it is felt that enough remain so that the majority of these sites would improve from "poor" to "fair" condition. Seed trampling by livestock, which this site would receive each year, would greatly improve the rate of response of basin wildrye. Response of basin wildrye sites grazed under similar conditions on adjacent private lands has been favorable.

Douglas (1915) showed that a 19-acre study area grazed after seedripeness had 100 percent more vegetation per unit area than adjacent range which had been moderately grazed May 10 to September 15 for two years, and 20 percent more vegetation than a one-acre area which had not been grazed at all for two years during a similar period.

Fall grazing each year would be detrimental to shrubs. The protein content of shrubs would be higher than grasses during this period. Palatable shrubs, such as bitterbrush, aspen, and willows would be sought after and heavily utilized. Improvement in these communities would not be anticipated.

Plowing and seeding would affect approximately 11,000 acres within this area. Impacts would be similar to those described for Management Area 3A.

Vegetative Production: Initiation of fall grazing and development of seeding projects will increase the forage production of this area. Studies conducted by Hormay (1970) indicate that forage production will increase by approximately 28 percent through fall grazing. Therefore, the initial production of native range will increase from approximately 6,250 AUMs to 8,000 AUMs. As range conditions improve over a 20 year period, the production will increase to approximately 26,000 AUMs.

The production of seeded areas will be the same as that discussed for area 3A since proposed seedings occur on the same ecological site. Initially, the production of the seeded areas will increase from approximately 260 AUMs to 2,700 AUMs. In 20 years the production of the seedings is expected to decline to approximately 1,350 AUMs.

Livestock Grazing

Management Area 3A

Field observation and consultation with the livestock operators indicates that there would be a high probability that the proposed four pasture system could not be implemented. The primary causes of the problem would be in the substantial differences in elevation between pastures and the highly irregular shape of the management area. The results of implementation of the proposed management could be extremely adverse to the livestock operator in terms of labor costs, herd health and production.

Assuming that the proposed management is reasonable, decreased livestock use would have an adverse impact on operators during the short-term (TABLE 2-9). Proposed seedings would produce adequate early spring forage in normal precipitation years, requiring no major changes in seasons of use. Within 20 years, livestock use would increase substantially over present levels.

Benefits from improved livestock nutrition would be as described earlier for similar situations.

Herding would not create additional impacts within this area since different herds are presently run together.

Twenty new miles of fence and 25 new water facilities would require a substantial increase in normal maintenance costs.

As previously described in the discussion of Area 2E, livestock would be disoriented for two to three years following implementation.

Management Area 3B

Adverse impacts of the proposed action would result from removal of livestock from early spring-summer native range at a time when optimum livestock gains are made. These allotments have a high percentage (60%) of native range which is not composed of Basin Wildrye. Therefore, the proposed management would be implementing an action which would result in less than optimum conditions for livestock gain in an area that is designated as a dominant livestock use area.

The proposed change to fall and early winter grazing on native ranges would have a slight adverse impact on livestock operators. Proposed seedings would offset forage losses by approximately 30 percent during the spring and early summer, which would lessen overall impacts.

A shift from consumption of relatively high-quality early spring and summer forage to lower-quality winter forage would result from fall grazing. Because the nutritional value and palatability of forage after maturity is lower in the fall than forage during the spring and early summer, fall and winter forage would not be suitable for grazing calves or young livestock. It can, however, support cows without calves or other livestock. Although the total number of licensed AUMs would increase by approximately 20 percent, the total pounds of livestock produced for sale would decrease.

Livestock losses might result from adverse weather conditions. The chance of losses and their severity would depend upon the severity of early winter storms and the management practices of individual livestock operators.

Weather and snowfall data have been collected at three weather stations adjacent to the study area over periods of 38 to 84 years (U. S. Department of Commerce, National Climatic Center, 1978). These data indicate that, during the month of December, there will be accumulations of snowfall greater than six inches for periods exceeding one week during 5-30 percent of the years (TABLE 3-16).

The maximum depth recorded was 18 inches. Snowfall accumulations were not recorded during October and only rarely (less than 1 percent of the time) during November.

If livestock were left on the range during snowfall accumulation, losses could occur due to starvation, thirst, or exposure. Close livestock supervision and removal of livestock during adverse periods would reduce the chance of loss to less than 10 percent during inclement periods.

Private lands currently used for fall pasture would not be used as heavily as they are now, partially offsetting any economic impacts. Hay requirements for base ranches during the fall and early winter would decrease. This might be of little consequence, however, since additional spring forage would be required and feeding of hay later in the spring might be necessary if additional spring pasture is not available on private lands. Livestock handling costs would remain unchanged.

Development of additional water sources would have similar livestock benefits and increased maintenance costs as previously described.

Long-term forage increases would be expected to offset adverse impacts of converting to fall grazing. Livestock AUMs would increase above present levels.

Wildlife

Management Area 3A

Wildlife would generally benefit from the grazing proposal. Adverse impacts on antelope and nongame species would result from plowing and seedings, although these are offset to a large degree by other elements of the proposal, such as later turnout dates.

TABLE 3-16

Chance of Accumulated Snowfall^{1/}

<u>Time Period</u>	<u>Recording Station</u>		
	<u>Ft. Bidwell</u>	<u>Cedarville</u>	<u>Sheldon</u>
December (1st week)	13	5	24
December (2nd week)	7	2	21
December (3rd week)	13	6	29
December (4th week)	18	12	34

^{1/} Figures represent the percentage of years that snowfall accumulated to 6 inches or greater depths for periods of one week or greater.

Source: National Climatic Center, Federal Building, Asheville, North Carolina.

Deer: Deer would be impacted as discussed in Area 2E. However, about 160 deer would compete for forbs and grass with livestock for one additional month (mid-May to mid-June). A moderate-use limit would provide 20-40 percent more browse and fenced meadows would insure succulent spring/summer forage in all pastures. Pasture fences and additional water sources would have slight, adverse and insignificant beneficial impacts. Deer forage would be able to support an increase from approximately 160 to 200 deer.

Antelope: Antelope would be impacted as described for Area 2E except that forbs would be available only until May 15 without livestock competition and bitterbrush forage would increase 20-40 percent. Seeding 10,000 acres to crested wheatgrass would have an adverse impact on antelope winter and summer range. Removal of sagebrush from winter ranges would reduce winter forage by 10 percent. Pronghorns have shown some adaptability to using exotic vegetation. Kepworth (1970), for example, reported use of winter wheat during winter where browse was not available. Martina (1967), on the other hand, documented pronghorn deaths from malnutrition on grasslands and survival on sagebrush range during a severe winter. Under the proposed management, 130 antelope could use the seedings or other winter range nearby.

Disturbance of summer range would have inconclusive impacts on 160 antelope. Long (1965) reports that some forms of mechanical disturbance increase forb production, the preferred food of antelope. Whether the disturbances resulting from plowing and seeding would result in increased forbs is unknown. It is assumed they would not, since grasses would be expected to out-compete forbs and because seedings generally show little forb composition even when planted. Wildlife biologists are in almost total agreement that ranges supporting a variety of vegetation are preferred by antelope over monotypic vegetation communities, especially seedings.

Thirty-five miles of fence would interrupt free antelope movement and may cause some mortality. Fence designs would reduce but not eliminate fatalities. Resultant impacts would be slight.

Antelope numbers would be predicted to increase from 130 to 230 during winter and from 160 to 280 during summer.

Sage grouse: Sage grouse would benefit from a one-month deferment from current grazing and from the ungrazed habitat provided by the rested pastures and from fencing 150 acres of meadows. Adverse impacts would result on the use pasture acres by allowing grazing during sage grouse nesting season. A reduction in potential sage grouse production would result, but an overall slight increase over present production would be expected. Other impacts would be as stated for Area 2E.

Chukar: Chukar would benefit from increased water distribution but population increases and habitat improvement would be insignificant.

Quail: Fencing Sand Creek and meadow areas would increase escape and roosting cover, a habitat requirement currently deficient. Additional cover would result in increased survival and potential population increases, depending upon seasonal weather conditions. Quail habitat would improve at a maximum rate in the fenced areas and at a moderate rate in the grazed areas. Rested pastures would provide improved forage and more cover. Grazed pastures would provide more cover and a slight increase in forage. Habitat improvement must be coupled with favorable weather conditions to increase quail numbers.

Nongame Species: Small mammals and birds would benefit from the reduction in grazing utilization and the provision of half of the area in an ungrazed condition each year. Fencing 50 percent of meadows and Sand Creek would benefit nongame species by allowing the most productive habitats to reach site potential. Increased cover and decreased disturbance would benefit small mammals and birds. Wiens and Dyer (1975) concluded that grazing, if conducted at moderate intensity, is not incompatible with proper habitat management for nongame birds.

Raptors: Prey species would be expected to increase, but, overall, raptor populations would not be expected to increase significantly.

Riparian Habitat: Fencing 5.5 miles of Sand Creek would result in increased cover and densities of willow, wild rose, serviceberry, snowberry, rushes, sedges, and aspen on 300 acres. Bird use and nesting production would increase. Increased canopy density resulting from willow and aspen growth would provide nest sites for cavity nesters. Aspens would provide nest sites for bluebirds, kestrels, great horned owls, and red-tailed hawks. Understory vegetation would provide nest sites for quail and meadowlarks. Use by harvest mice, moles, shrew, meadow mice, and rabbits would increase due to the presence of rank vegetation and its provision of cover and moisture.

Aquatic Habitat: Elimination of livestock grazing results in the most rapid improvement in productive riparian and aquatic habitats (Platts, 1971). Platts (1978) examined impacts of eight grazing systems and concluded that only no grazing would result in riparian/aquatic habitat improvement from "good" to "excellent" condition. Ames (1977) also concluded that protection of riparian habitat where grazing is an established use can only be effectively achieved through fencing.

Increased vegetation density and diversity is the key to habitat improvement in and out of the streams. Winegar (1977) reports that, after less than 10 years of rest, a fenced stream which was in very poor condition responded with phenomenal growth of native plants. Of 45 plant species found abundantly within the protected area, only 17 were known to be present before fencing. Plants established faster downstream from the area fenced due, in part, to the dissipation of hydraulic energy through upstream plants. Increased vegetative cover would lower stream temperatures by shading the stream.

Boussu (1959) found that the greatest benefit of riparian vegetation is the cover it provides for aquatic organisms. White (1973) proved that increased abundance of trout was achieved by protection of streambank vegetation. Phillips (1931) found that stream reaches covered with brush supported more streambottom organisms than did clear areas of the stream. Wildlife use on Winegar's (1977) stream, discussed above, was 100 percent greater on the 2.5 miles of fenced stream than on the 2.5 miles of unfenced stream.

Exclusion of livestock by fencing Sand Creek would allow restoration of the channel from the effects of grazing and trampling by increasing bank stability and stream cover. Water temperatures would be expected to remain below 65 degrees fahrenheit on most of Sand Creek due to increased vegetative cover/shading.

In addition, riparian vegetation greatly reduces streambank erosion by slowing current velocities and by maintaining moist soil conditions. Riparian vegetation also traps fine particles being carried toward the stream by sheet erosion. Gravels presently obscured by silt would become less obscured and more suitable for fish spawning. Viability of fish populations would improve.

Management Area 3B

Grazing from August 15 to December 31 to moderate-use level would benefit wildlife.

Deer: The 5,000 acres of low-density deer range would be adversely impacted. However, because only an estimated 40 AUMs of deer use annually occurs on the area, overall impacts would be insignificant. Livestock grazing from August to December would be expected to result in overgrazing of the limited available browse species. Failure to use browse species as key species to determine utilization limits would leave no safeguards against overgrazing. Slight beneficial impacts would result from the deferred grazing season.

Antelope: Antelope habitat is limited to 4,000 acres in the southern portion of this management area. Antelope (30-40) summer in that area and would benefit from the proposed grazing management. Competition with livestock for forbs would be eliminated until mid-August. Pronghorn would thus be able to select the most succulent and nutritious forage. Animal condition would improve and fawns produced would be stronger with better survival potential. Due to the limited amount of habitat involved, the overall effect on the total antelope population in Cowhead/Massacre would be positive but of minor importance.

Sage Grouse: The 45,000 acres of sage grouse habitat and the 500 sage grouse that inhabit this management area would benefit from the proposal. Habitat quality would improve, resulting in a slight population increase.

Provision of spring and summer habitat free from the influence of livestock would improve sage grouse habitat by providing more cover for nesting, by eliminating nest disturbance, and by providing forage free from livestock competition. Slight competition would continue from mid-August until mid-September on meadow habitat, but fencing 50 percent of the meadow habitat would insure that half of the meadows are competition free.

Nongame Species: Raptors would not be significantly affected. Availability of suitable nesting cliffs is more of a limiting factor than prey base.

Basin Wildrye Habitat: Over 90,000 acres of Management Area B is composed of greasewood/basin wildrye and big sagebrush/basin wildrye ecological sites. Grazing of basin wildrye only after seed-ripe would provide greater wildlife cover and forage. Habitat structure would improve because grazing would not begin until basin wildrye reaches almost 100 percent of shoot growth. Moderate use would allow 40-60 percent removal of this shoot growth. A net increase of about 30 percent cover would be expected.

Small-mammal species richness would increase. As basin wildrye becomes more abundant, western harvest mouse and little pocket mouse numbers would increase. Both of these species are closely tied to brushland with good grass cover (Larrison and Johnson, 1973).

Impacts of grazing management would not be expected to have significant effects on species composition but a significant impact would be expected on nongame bird production. Comparison of basin wildrye areas after 35 years of exclusion from grazing showed little change in bird use compared to present conditions in this area. Deferred/ winter grazing on an annual basis would have slightly significant impacts on present breeding birds, however. All species would be able to nest without nest disturbance or destruction caused by livestock grazing; increased cover would improve nesting habitat condition.

Low Sagebrush Habitat: About 31,000 acres of Area B is low sagebrush habitat. Grazing after seedripe each year would improve habitat condition, increase cover, and provide habitat free from the direct impacts of grazing during spring and summer. Impacts would be highly beneficial until August, then moderately adverse. Small mammals would benefit by increases in cover. Sagebrush voles and least chipmunks and deer mice would become more abundant.

Habitat structure would not be expected to change enough to cause major changes in bird species composition but improved nest production through less nest trampling and disturbance would occur.

Wild Horses

Management Area 3A

Wild horses would be managed at current levels (31) within this area.

Horses remaining in this area would generally benefit from improved range conditions and the development of additional water sources, as previously described. Fencing around sensitive habitats would also have impacts similar to those described earlier. Moderate-use limitations, later turnout dates, and periodic rest would ensure that horses have adequate feed.

Although construction of considerably more pasture fence is proposed for this area than others, it would be expected to have little impact on wild horse movement. Horse use is confined to a small area and major seasonal migrations do not occur. The specific locations of pasture fences are presently unknown; potential impacts could occur if their placement were to disrupt the horses' home range.

Cultural Resources

The proposed management of this sub-unit, by improving range condition, would reduce erosion and would thereby benefit archaeological and historic sites. In Management Area A direct livestock-related impacts would be reduced from their present level. In Area B they would be slightly increased.

Management Area 3A

The proposed 32-percent reduction in livestock use (and fencing of Sand Creek and 50 percent of the meadows) would reduce trampling pressures on the approximately 2,800 sites predicted to lie in the management area. Two sites of apparent National Register quality occur where livestock congregate and, where not fenced, would continue to receive impacts more severe than the majority of sites.

Management Area 3B

While the projected improvement in range condition would have the beneficial effect of reducing erosion, trampling of sites would continue at a rate above the present situation (owing to the proposed 31 percent increase in livestock use). Limiting the season of use to fall and winter would result in reduced impacts from trampling during those periods when the ground is frozen or covered with snow. Approximately 3,000 sites are predicted to occur within the zone of potentially increased impacts. More intense impacts would occur at two sites of apparent National Register quality where livestock congregate.

Recreation

Impacts of the proposed action on recreation are summarized in TABLE 3-17.

Wilderness

Sub-Unit 3 contains only small portions of two WSA's, both within Management Area 3B. Continued grazing would continue to impact the natural character of the landscape through vegetative trampling, particularly around water sources, trampling of archaeological sites, degradation of water quality, and the unnatural visual impacts of livestock within WSA's. Changing to fall and winter grazing would be detrimental to shrubs such as bitterbursh, aspen and willows. However, overall increase in forage production and prohibiting grazing in spring and summer would improve sage grouse and nongame wildlife habitat, thus increasing hunting and viewing opportunities. Raptor and wild horse and burro populations would not be affected.

TABLE 3-17

Impacts on Recreation Resources in
Sub-Unit 3, Long Valley/Sand Creek

MANAGEMENT AREA(S)	USES IMPACTED	IMPACT RATING	IMPACTS
A	Hunting		
	Big Game	+ M	Increased deer and antelope populations
	Upland Game	+ M	Increased sage grouse, quail, and chukar populations
	Sightseeing	+ L	Improved range condition and visual variety of range treatments
B	Sightseeing	+ L	Improved range condition and visual variety of range treatments

Socio Economic Conditions

Eighteen permittees use this sub-unit. Bunyard and Earp are discussed under Sub-Unit 1, Heryford and Joe Parman under Sub-Unit 2, and L & L Cattle Company and Peterson under Sub-Unit 4.

More of the family-run ranches headquartered in the Surprise Valley would be affected by any management changes recommended for Sub-Unit 3 than in any of the other three sub-units.

Although reductions in numbers and in time would be moderated by the seedings proposed for these management areas, several operating cost increases would still face these permittees. Proposed fall and winter grazing in Area 3B would require the development of early season feed sources by 14 of the 18 permittees in the sub-unit, as well as limiting the native range use to dry cows. The assumption of use by soley dry cows is based on the low nutritive value of most range forage after plant dormancy. As concluded in Oregon studies, calves destined for marketing should be removed from the native range since forage quality is so poor that animal weight gains are slight (Squaw Butte Experiment Station, 1965). The proposed four-pasture system in Area 3A would increase labor costs throughout the season for herding and for rotating cattle from pasture to pasture, as well as for separating cattle at the fall gathering. Three of the ranchers including the two permittees already discussed under Sub-Unit 1, would be hard pressed to remain in business. Six of the 18 would be required to make livestock and ranch management changes if they were to maintain stable operations.

Berryessa

Berryessa's major needs under the proposal would be an additional 170 AUMs of feed between May 1 and the end of the season. Leased pasture for late summer and fall, assuming that it could be found, would add an additional \$2,400. If leasable pasture were not available, already-owned flood meadows might be used, at a possible loss in production of 260 tons of meadow hay (at a foregone potential value of \$13,000). Another possibility would be the development of irrigated pasture, adding approximately \$5,000 in annual interest and operating costs. In summary, the proposal could add between \$3,200 and \$13,000 in net annual feed costs to Berryessa's ranch. Berryessa (1978) maintained that he would stay in business with the proposal, but the change would translate into extra costs.

Hapgood

The proposal would require finding additional feed for 100 head from April 16 to April 30 and for 50 head from May 1 to May 31. Keeping these cattle on private pasture presently under flood irrigation would probably result in a hay production loss of about 70 tons. Replacing this hay for wintering the herd would add about \$3,500 to the annual operating expense. Under Hapgood's present management, the proposed late fall and winter use of Area 3B would be of limited benefit.

Norene Hill (Ed)

The proposal would require Hill to find additional pasture or rangeland for 35 head from April 16 to May 31 and for 270 head from June 1 to August 15. If Hill's lease on two sections of private land in Long Valley is renewed next year, he feels that this land and his own deeded land in Long Valley, currently being used as fall range, could both be used as early season range (Hill, 1978). In this case, the proposal would necessitate only minor changes in his current operation. If the lease is not renewed, his response would probably be to develop his deeded land and purchase another ranch of about 250 acres for use as pasture. These options would require an investment of about \$125,000 and would add about \$13,000 in interest payments and operating costs to his annual expenses.

Jones

The proposal would allow Jones to receive an increase in permitted numbers, from 40 to 75 head. No change in season of use will be required. The increased use would increase forage requirements of the ranch to winter the increased permit. Total benefits would increase moderately.

Kirkpatrick

Kirkpatrick would face a moderate reduction in numbers from his present licensed use. The proposal would require that feed be found for an average of 95 head presently grazing on the public lands from May 1 to August 15. Irrigated pasture to accommodate this cutback would require an investment of about \$47,500 and would increase Kirkpatrick's annual interest and operating costs by about \$4,800.

Laxague

The major adverse impact of the proposal on Laxague's BLM permit would occur between April 16 and April 30. The conversion of use of private flood meadows to pasture would probably be the cheapest response to the proposal. Such grazing use would reduce hay production of these lands by about 120 tons, adding about \$6,000 to Laxague's annual feed costs.

Page

The changes in Page's operation induced by the proposal would occur after September 15 when 40 head would remain until November 30. This would reduce Page's hay use during the winter by up to 50 tons. This additional hay could be sold.

Ralph Parman

Parman's small operation handled by his brother would not be significantly affected by the proposal. Twenty-six head would be removed from the public range two weeks earlier than at present. Seven additional tons of hay would be required to offset the earlier take-off date. This would add approximately \$350.00 to Parman's annual operating expenses.

Quirk

The proposal could be beneficial to Quirk's operation, by allowing him to remain longer on the public lands. This would enable Quirk to sell approximately 263 AUMs of private forage either as hay or fall pasture.

Smith

The impacts of the proposal would be as discussed for Quirk, except that Smith would have only approximately 75 AUMs of available forage.

Steward

The proposal would cause beneficial changes in Steward's present BLM permit. Steward would increase his maximum permitted numbers from 99 to 112 head and fall use would release up to 75 AUMs of hay or pasture for possible use.

Warren's Ranch

Warren's Ranch is currently in a position to restock the ranch to its capacity after several years of operating with a below-capacity herd size. The proposal would help their potential expansion.

Total permit size would increase from 302 to 307 head. Three hundred twenty-five (325) AUMs of forage currently used on the ranch in the fall could be used on public lands. This could help with expansion or be sold as hay or pasture.

Vegetation

Management Area 4A

Since specific grazing management systems have not been designed for this area, vegetative response cannot be predicted. Establishment of a May 15 turnout and limiting utilization to moderate use would provide a good starting point from which livestock operators could apply sound management. If grazing management were not applied which satisfies the growth requirements of affected species, downward trends would be anticipated on livestock concentration areas. On areas that actually receive moderate use or less, vegetative response should be positive.

Management Area 4B

Vegetative Condition and Trend: Most of this area would show improvement within 20 years (TABLE 3-5). The proposed three-pasture grazing system would satisfy the growth requirements of most plants. The rest provided during the growing season in two out of three years would be sufficient for most grasses and forbs. Shrubs that replenish food reserves during the late fall, such as antelope bitterbrush, would be utilized during the critical growth period in two out of three years. Fecal analysis studies conducted on the Tulead-Home Camp Units immediately south of the study area show that livestock utilize bitterbrush from July until September and therefore some use would be made on bitterbrush in both the early use and the seed ripe pastures. One year of rest on heavily utilized bitterbrush plants would not be sufficient to maintain the vigor of some plants (Trlica, et al., 1977). Also since bitterbrush produces seed on previous years leader growth, seed production on areas which may receive heavy use would be limited. Restricting average utilization levels to 50 percent will enhance bitterbrush response on most areas since only smaller areas near water and livestock concentration areas would receive use heavy enough to limit vigor recovery or seed production and seedling establishment. Successful bitterbrush reproduction has been observed on moderately stocked three pasture grazing systems in the Pueblo Mountain and Gravelly AMP's (previously discussed in the general vegetative section). Aspen and willow response would be variable and would depend upon the degree of utilization. The majority of the area would respond and be in "fair" or "good" condition in 20 years.

Vegetative Production: The vegetative production of this area would increase. Benefits from implementation of the grazing system would be similar to grazing systems previously discussed. Initially, forage production would increase from approximately 6,400 AUMs to 7,900 AUMs. As range conditions improve, the estimated forage production in 20 years will be approximately 20,000 AUMs.

Management Area 4C

Vegetative Condition and Trend: This area would show considerable improvement within 20 years (TABLE 3-5). Vegetative response of ecological sites would be similar to Management Areas 2C, 2E, and 3A. Most of this area would be in "fair" or "good" condition in 20 years.

Vegetative Production: The vegetative production of this area would increase. Benefits from implementing the grazing system would be similar to those previously discussed. Initially forage production would increase from 13,400 AUMs to 16,500 AUMs. In 20 years, forage production would be approximately 45,000 AUMs.

Livestock Grazing

Management Area 4A

The management flexibility provided operators within this area precludes assessment of specific impacts. Since reductions or changes in seasons would not deviate from present practices, short-term adverse impacts would not occur. An adjustment in present management practices however, might be required to maintain upward vegetative trends and reach resource objectives.

Issuance of 10-year permits would provide security and stability in ranching operations and should promote sound livestock management practices since operators would be assured of being able to reap the benefits of improved range conditions.

Fencing portions of meadow and aspen stands would not be expected to significantly affect forage supplies or create undue disruption of normal operations.

Management Area 4B

Initial livestock reductions and changes in season of use would have adverse impacts on livestock operators. Livestock use would be anticipated to increase within 20 years and would offset short-term forage losses (TABLE 2-9).

Beneficial as well as adverse impacts associated with implementing grazing systems would generally be as described previously.

Since the proposal does not specify how existing allotments or pastures would be combined or fenced to implement systems, it would be anticipated that some allotments would be combined with other use areas. Resulting adverse impacts would be as described in Area 2E.

Because it contains individual pastures, the Crooks Lake Allotment would not likely be combined with other allotments. Additional livestock production benefits would not be as great within this allotment as others since the existing grazing system already provides some livestock benefits.

The impacts of the proposed range facilities would be as discussed previously.

Management Area 4C

Field observation and consultation with the livestock operators indicates that there is a high probability that the proposed four pasture system could not be implemented. The causes would be the same as those discussed for Management Area 3A. In addition the probability of developing the necessary water to implement the proposed system is low.

Assuming that the proposed management is implementable, later turnout dates and reductions in livestock use would have short-term adverse impacts. Long-term forage increases would offset short-term forage losses (TABLE 2-9).

Beneficial and adverse impacts would generally be as described earlier. Combination of existing allotments would be anticipated. Resulting impacts would be as described in Area 2E.

The development of proposed fences and water facilities would also have impacts similar to those previously discussed.

In summary, adverse impacts resulting from maintenance and herding costs and from short-term livestock disorientation would be relatively minor. Beneficial impacts would result through improved livestock nutrition and production. These would not, however, offset significant impacts resulting from changing seasons of use and reducing livestock numbers. The latter would require major adjustments in normal operations and might cause some operations to go out of business. This aspect is further treated in the social and economic conditions section of this chapter.

Wildlife

Management Area 4A

Non-intensive management constrained only by season of use and a moderate use limitation would not differ greatly from present management. Impacts on wildlife on these 52,000 acres would be difficult to predict. Keying utilization to bitterbrush and fencing meadows would provide beneficial impacts. However, the Nevada Department of Wildlife (1978) states: "Custodial management proposed for those allotments of private lands is in reality no management at all as has been proven many, many times previously within the State of Nevada." Within only the stated constraints, ranchers might implement whatever grazing management systems they prefer.

Game Species: Over 600 deer would benefit by limiting utilization to 40-60 percent of annual bitterbrush production. A 20-40 percent increase in available bitterbrush browse would result. Overall numbers of deer would increase to 750.

Sage grouse would benefit from fencing meadow areas. General habitat improvement would not be expected as a result of grazing constraints alone.

Nongame Species: Impacts cannot be determined.

Aquatic Habitat: Eight Mile, Nine Mile, Ten Mile, and Eleven Mile Creeks would not be expected to show significant change from conditions described in Chapter 2.

Management Area 4B

Deer: Vigor of important deer food and cover plants would improve due to rest and seedripeness treatments. Bitterbrush, one of the most important browse species, would continue to be overbrowsed on 11,500 acres but to a lesser degree. Utilization would decrease by an estimated 10 percent but could still exceed the moderate use recommended for bitterbrush. Resting one third (4,000 acres) of the range would provide forage and cover for deer without competition. Annually, more forbs and grasses would be available for deer on about 30,000 acres. Condition of individual animals would improve as a result of the improved forage availability in spring. Does would benefit most by being in better condition and yielding healthier fawns. Does would have access to all nutritious forage without competition from livestock during the first two months of nursing on one-third of the range and for the entire nursing time on another third of the area. Deer would be expected to increase from 75 to 80 animals.

Antelope: Response of important antelope food plants to the proposed systematic grazing would be expected to vary.

Increases in density and variety of perennial forbs, an important part of the antelope's spring diet, would be expected on most ecological sites as a result of the three-pasture grazing system. Competition between livestock and antelope for early spring forage would be eliminated on two-thirds of the study area annually.

Approximately 31,000 acres grazed from May 15 would receive moderate livestock use; competition between antelope and livestock would be slight. Implementation of the grazing system would increase the spring and summer forage for antelope. Does would have increased succulent green forage in the spring and would give birth to kids in better condition to withstand decimating factors. As kids grow and are weaned, they continue to maintain good body condition if they are able to eat high protein forage. Good body condition in fall and winter aids the kids in their struggle for survival through the winter. Better kid survival means more recruitment, resulting in a larger antelope herd.

Antelope numbers would be expected to increase 50 percent from 60 to 90 on winter ranges and from 190 to 270 on the summer range.

Sage Grouse: Sage grouse would benefit from increased plant vigor, increased vegetative density, increased composition of grasses and forbs, maintenance of sagebrush, and increased plant succulence by periodic removal of rank vegetation. Important meadows, ungrazed on two-thirds of the study area for most of the brooding season, would be expected to improve. Meadows would be reestablished in areas where meadow vegetation has been replaced by less desirable species.

The overall impact on the sage grouse population would be a moderate increase in numbers.

Chukar: Spring development and longer duration of streamflows would expand suitable chukar habitat. New water sources would allow chukar to expand into new habitat. The degree of expansion would be expected to be slight. About 150 birds would be impacted in 13,400 acres of habitat.

Nongame Species: Nongame species would increase as a result of moderate-use limitation and deferred and rest grazing treatments. Reduction of grazing use by about 25 percent would improve habitat structure and increase forage and cover.

Management Area 4C

The grazing systems proposed for this management area and for Area 2E are similar. The impacts on these two areas would also be similar.

Deer: Forage competition would be reduced by over 60 percent. Browse condition, especially bitterbrush, is considered a critical habitat component in this area (Nevada Department and Fish and Game, 1978). A moderate-use limitation on bitterbrush would reduce the current level of use by up to 40 percent, but it would not insure that total grazing use (by antelope, deer, and livestock) above that recommended for bitterbrush does not occur. Hormay (1943) found that about 40 percent of twig growth should remain on bitterbrush plants each season to maintain plant vigor and to insure adequate seed production.

Continuous heavy grazing by livestock season after season is considered the main cause of deterioration of bitterbrush on the range (Hormay, 1943); therefore, reduction of livestock use and periodic rest from grazing would be expected to improve plant vigor and seed production, thus increasing deer browse availability and abundance.

Non-grazed pastures would provide all habitat needs without livestock competition. Decreased grazing pressure on grazed pastures would improve habitat conditions. As deer habitat condition improves, deer production and survival would increase. Deer habitat would be expected to support a 30 percent increase in deer numbers from 400 to 520.

Fencing would cause some deer injuries and occasional fatalities, but long-term impacts would not be significant.

Thirty-five water developments would improve water distribution for use by deer but they would not have a significant impact on the deer population.

Antelope: The 275 antelope summering (April-October) in Area 4C would benefit from the grazing system. Resting 50 percent of the range each year would provide over 50,000 acres of habitat free from forage competition with livestock. Starting livestock use of the range on May 15 would provide about a 30-day increase in exclusive antelope use in spring. Total competition between livestock and antelope would be reduced by over 60 percent annually. Moderate use (40-60 percent) keyed to bitterbrush would provide about 30 percent more browse from this key forage species. Reduction of competition and moderate-use levels would result in increased forage quantity and quality. Antelope production and survival would increase; an estimated 75-percent population increase would be expected. Summer residents would increase to 480 antelope.

Sundstrum, et al. (1973), indicated that high-quality food is the key to maximum production. Ferrel and Leach (1950) examined antelope food habits in a nearby area and found that: (1) forbs constituted 35 percent of the May-June diet and 50 percent of the August-September diet; (2) bitterbrush represented 10-14 percent of the spring-summer diet, and (3) big sagebrush represented over 35 percent of the diet in all seasons.

Buechner (1947), in studying antelope-livestock forage use relationships, concluded that antelope prosper on cattle ranches even on overgrazed ranges because cattle consume grass and leave most forbs and browse.

Fecal analyses conducted in two planning units adjacent to Cowhead/Massacre by BLM (1977) generally concur with the findings of Ferrel and Leach and Buechner. Some cattle fecal samples indicate that, during July-September, forbs constitute up to 43 percent of the cattle diet and bitterbrush up to 25 percent, in some isolated cases.

Fences would disrupt local antelope movement to a slight extent. Generally, fences would only be an inconvenience except under unusual climatic conditions, when moderate mortality could occur. The Fencing Committee for the Antelope States Workshop in 1974 concluded: "It cannot be assumed that antelope will adapt to changes in habitat resulting from livestock use or that they will learn behavior patterns that will permit them to thrive where their physical environment has been altered by fences." It would be predicted that some mortality would occur, but this would be offset by population increases resulting from improved forage quantity and quality.

Sage Grouse: Impacts on sage grouse in this area would be similar to those discussed for Management Area 2E, except that competition for forbs here would begin in mid-May and sage grouse nesting success would remain around current levels in one of four pastures. Since the area is considered marginal sage grouse range, the May 15 turnout would have little significant impact on sage grouse production in the Cowhead/Massacre study area.

Quail: Providing fenced, undisturbed riparian habitat would greatly improve quail habitat and allow population increases. Actual population increases, however, would be highly dependent upon favorable weather patterns.

Nongame Species: Generally, impacts on nongame species would be similar to those discussed under Management Area 2E.

Raptors would have a greater prey base, but prey would have increased cover. Thus, no significant change in raptor numbers would be expected.

Riparian/Aquatic Habitat: The riparian and aquatic habitat areas of Twelve Mile Creek and Coleman Creek would be substantially improved by the exclusion of grazing. Impacts would be similar to those discussed for Sand Creek in Management Area 3A.

Wild Horses

Management Area 4A

All nine horses within this area would be removed.

Management Area 4B

Wild horse numbers would be maintained at 20.

The impacts of the proposal would generally be beneficial to wild horses remaining within this area. Beneficial effects from improvement in range conditions, the development of additional water, moderate-use limitations, later turnout dates and periodic rest would be as previously described. Similarly, the adverse impacts from stream and meadow fencing would be as previously described.

A potential adverse impact exists as a result of construction of additional pasture fences. Lack of specific fence locations, however, precludes the quantification of impacts at this time.

Cultural Resources

The proposed management of Areas 4B and 4C would reduce the intensity of livestock-related impacts on cultural resources. Area 4A would experience no substantial change. Throughout the sub-unit the effects of livestock concentrations would be reduced or eliminated by fencing 50 percent of the meadows, although the number of sites which would be benefitted cannot be predicted until specific projects are identified.

Management Area 4A

Non-intensive management implies that BLM would not control animal numbers or grazing formulae. As moderate forage utilization would be the chief limiting factor on livestock use, little change in livestock-related impacts would be anticipated. Approximately 1,000 archaeological sites are predicted to lie within the management area, and they would continue to be subject to the present degree of animal pressure. Of these, six sites are known to occur where livestock congregate, and one district is believed to be of National Register quality.

Management Area 4B

The proposed 16-percent reduction in livestock use would reduce trampling pressures on the approximately 2,000 sites predicted to lie within the management area. Two sites believed to be of National Register quality are known to occur at places of livestock concentration and, where not fenced, would continue to receive more intense impacts.

Management Area 4C

Reduction in livestock use by 19 percent would substantially diminish the intensity of animal pressures on approximately 3,000 predicted archaeological sites. Foci of livestock activity (and thus more intense impacts) occur at the locations of two sites which are of National Register quality. Those left unfenced would deteriorate more rapidly than the majority of sites.

Recreation

Impacts of the proposed action on recreation are summarized in TABLE 3-18.

Wilderness

Sub-Unit 4 contains nearly all of the Sheldon contiguous WSA, located entirely within Management Area 4C. Reducing grazing by 42 percent, moving to a rest rotation system, and shortening the season of use would have positive effects on wilderness resources. Vegetation conditions would improve and wildlife populations increase due to less competition for forage. This will enhance the aesthetic quality of the Sheldon contiguous WSA and improve hunting and wildlife viewing opportunities. Reducing livestock herds would also lessen damage to archaeological sites from livestock trampling.

Social and Economic Conditions

Sub-Unit 4 is used by 14 operators. One, Bunyard, is discussed under Sub-Unit 1.

TABLE 3-18

Impacts on Recreation Resources in
Sub-Unit 4, Mosquito

MANAGEMENT AREA(S)	USES IMPACTED	IMPACT RATING	IMPACT
A	Hunting		
	Deer	+ L	Increased game populations.
	Antelope	+ L	Increased game populations.
	Upland Game	+ L	Increased game populations.
B	Hunting		
	Deer	+ M	Increased game populations.
	Antelope	+ M	Increased game populations.
	Wild Horses		
	Upland Game	+ M	Increased game populations.
C	Hunting	+ M	Same as B.
	Fishing	+ M	Improved habitat and fishery condition on 12 Mile Creek.

The 14 operators in Sub-Unit 4 would face several major changes in their current permits. Turnout dates would be delayed in this sub-unit for all of the ranchers. Reductions in permitted AUMs within the sub-unit would range from none to 48 percent. Management costs per head on the public lands would increase due to the reductions in allowed numbers and the increased herding and gathering costs arising from the proposed grazing systems. Medical and calf mortality costs would increase due to keeping the cows and calves on private pasture for longer periods of time. An additional cost facing some of the operators in this sub-unit would arise from the proposed use of intermingled private lands. Owners of these parcels would have to either fence them or give up any present use that would conflict with that use allowed under the proposal.

As seen below, large cost increases would be incurred by nine of the operators in this sub-unit. As many as five of the operators might be forced out of business by the proposal (including Bunyard, discussed in Sub-Unit 1).

Bordwell

The proposal would delay Bordwell's present turnout date by one and one-half months. This would require the development of feed of about 230 AUMs from early April to May 14. A combination of hay purchases until private meadowlands are dry enough for pasturage, and replacement winter feed purchases due to lost production on his flood meadows would increase Bordwell's hay needs by about 130 tons. Feed costs for Bordwell's operation would increase his annual operating costs by about \$6,500.

L & L Cattle Company

The L & L Cattle Company uses Sub-Units 3 and 4.

The proposal would introduce severe limitations in L & L Cattle Company's current annual feed schedule. Turnout would be delayed by up to six weeks, and permitted numbers before August 1 would be reduced by about one-quarter. Overall, L & L Cattle Company would have to develop additional feed sources capable of providing the 1,100 AUMs reduced by the proposal.

Herd reductions proportional to the cutback would not be feasible due to present commitments to various fixed costs and to debt servicing. To be able to operate at the full capacity of the ranch, an additional ranch would probably have to be purchased and put into hay and pasture production. A minimum of 160 acres in high production would be necessary to offset the proposed reductions (30 acres of alfalfa lands producing at least 5 tons/ac. and 130 acres of irrigated pasture yielding 6 AUMs/ac.). This would require an initial investment of about \$142,000 and add about \$17,500 to annual interest and operating expenses.

Carey, F. & J., and Carey, P. & J.

The Carey operations would be similarly affected by the proposal.

Kyte

Kyte's operation would lose a month of early season use (April 16 to May 14) and two months of late season use (October and November) for about 148 head. This would be a loss of 444 AUMs. During the proposed grazing season (May 15 to September 30), Kyte would gain 234 AUMs over his present permit. The 210 AUM net loss would add approximately \$5,000.00 to Kyte's annual operating expenses.

Peterson

This operator uses Sub-Units 3 and 4.

Peterson would not be significantly affected by the proposal. He presently turns out 136 head in Areas 4A and 4B on May 1. These are moved onto his Forest Service permit from June 16 to September 30. The rest of his cattle are kept on private lands. The proposal would delay most of his turnout by four weeks (to May 15) and would permit about 56 head to graze through September 30. If the proposal were adopted, Peterson figures that a two-mile gap fence across his private land in the West Allotment and a spray treatment would increase his forage production enough to handle the proposal's cutbacks. This treatment would require an investment of about \$10,000, adding about \$1,000 to his annual interest and operating expenses.

Schadler, George

Since the BLM permit is a small part of Schadler's operation (Centaur Management Consultants, 1978), the proposed action (FIGURE 3-4) would have almost no effect on this ranch.

Schadler Ranches, Inc.

Schadler Ranches would be severely affected by the proposal. Early season use (from April 16 to May 14) for about 900 head would be completely eliminated. The proposal would allow a May 15 through September 30 grazing season for 901 head.

Pasturing his flood meadows to accommodate the spring cutback would require the purchase of about 515 tons of hay due to lost hay production, which would add about \$27,000 to Schadler's annual operating costs. Additional costs accruing to Schadler's operation would be associated with either fencing or loss of late fall use of intermingled private lands in Area 4A, increased medical and/or mortality costs from keeping cows and calves confined on private pasture during the spring, and possibly lower calving percentages and weaning weights from using lower elevation lands later in the year than he presently does.

Schadler could not continue his present way of operating if the proposal were adopted.

Wolfsen MC Ranch

The Wolfsens presently run 274 head from May 1 to August 31. The proposal would limit their turnout to 206 head from May 15 to September 30. If the proposal were adopted, the Wolfsens would find the average cost per cow to use the public lands prohibitive and would probably let their lease on this permit revert to its owner, Anna O'Sullivan of Adel, Oregon.

The effect on anyone using this BLM license would include the following: (1) annual hay costs would increase by about \$8,500 to replace the loss in production from pasturing cattle on private meadowland; (2) gross revenues from weaner sales would decrease by about \$3,300 (net of grazing fee reductions) if a herd were reduced by a number proportional to the summer grazing loss (68 head); or (3) development of 80 acres of irrigated pasture would require an investment of about \$45,000 and would increase annual interest and operating expenses by about \$4,500.

The probable impact of the proposal would see the Wolfsens giving up their lease, and Mrs. O'Sullivan continuing to lease her grazing privileges to other ranchers rather than returning the ranch to a family-run business. This could have a substantial impact on Mrs. Sullivan if no other operators wanted the lease.

CHAPTER 4

MITIGATION MEASURES

Chapter 4

MITIGATION MEASURES

The measures described in this Chapter are intended to reduce or eliminate adverse impacts of the proposed action identified in Chapter 3. If the proposed action is implemented, the Bureau is committed to carrying out all mitigation measures described in this section.

(1) Prior to the implementation of any rangeland projects (including, but not limited to, revegetation projects, spring developments, reservoir construction, pipelines, and fencelines), BLM cultural resources staff will conduct intensive (Class III) field inventories of the impact zones of the proposed projects. Where cultural sites are identified, effort will be made (e.g., through project redesign) to avoid the accrual of adverse effects. Where that is not possible, BLM will consult with the appropriate State Historic Preservation Officer and the Advisory Council on Historic Preservation in accordance with the terms of the Programmatic Memorandum of Agreement between the Bureau and the Council, dated January 14, 1980, which prescribes procedures for developing mitigation measures to lessen the impact of adverse effects.

Impacts on cultural resources resulting from range projects as described in Chapter 3 would be substantially reduced through implementation of this mitigation measure.

(2) Twelve archaeological sites and one district potentially eligible for nomination to the National Register will be fenced (about 5 miles of fencing) to prevent the passage of livestock.

The intent of this mitigation is to lessen impacts in areas where cattle and wild horses tend to congregate, resulting in more intense degradation of cultural resources.

(3) Proposed pasture fences will not be constructed immediately in all cases. Herding and water availability for livestock will be managed to control livestock in areas where livestock operators and the BLM agree on feasibility during allotment management plan development. Should herding and water manipulation prove unworkable, fences will be installed.

This measure is designed to reduce impacts on wildlife, wild horses and scenic quality resulting from fences.

(4) Where fences cross trails used by recreationists, livestock operators, wildlife, or wild horses, walk overs, gates, antelope crossings, cattleguards, let down fence panels, or other appropriate devices will be installed.

This mitigation intends to minimize the impediment to free travel that fences create (see Chapter 3).

(5) Herbicide sprays, brush beating, burning, and chaining will be used as alternate methods of brush removal for the development of seedings.

This mitigation intends to reduce the impacts of seeding development created by plowing for brush removal. The methods mentioned will reduce soil loss and cultural resource disturbance and will provide a better seedbed.

(6) Herbicide sprays will be used as an alternate method of brush removal for the release of native forage species.

This mitigation is intended to reduce the impacts created by burning and chaining for brush removal on some sites. Spraying is less disruptive than chaining or burning on some vegetative sites, for example, sprays can be used on bitterbrush/big sagebrush sites to selectively kill big sage without killing the bitterbrush.

(7) The grazing formula to be applied to the Twelve Mile and Lartirigoyen Allotments will be developed by the BLM for the protection and enhancement of those listed species present, Galium glabrescens ssp. modocense and Cordylanthus capitatus. These two plants will also be included as key species in the management systems developed and no use to very light use will be allowed on them. Season of use and utilization will be altered to best suit these two species.

This mitigation will ensure that the potential adverse impacts on threatened and endangered plant species described on page 3-17 do not occur.

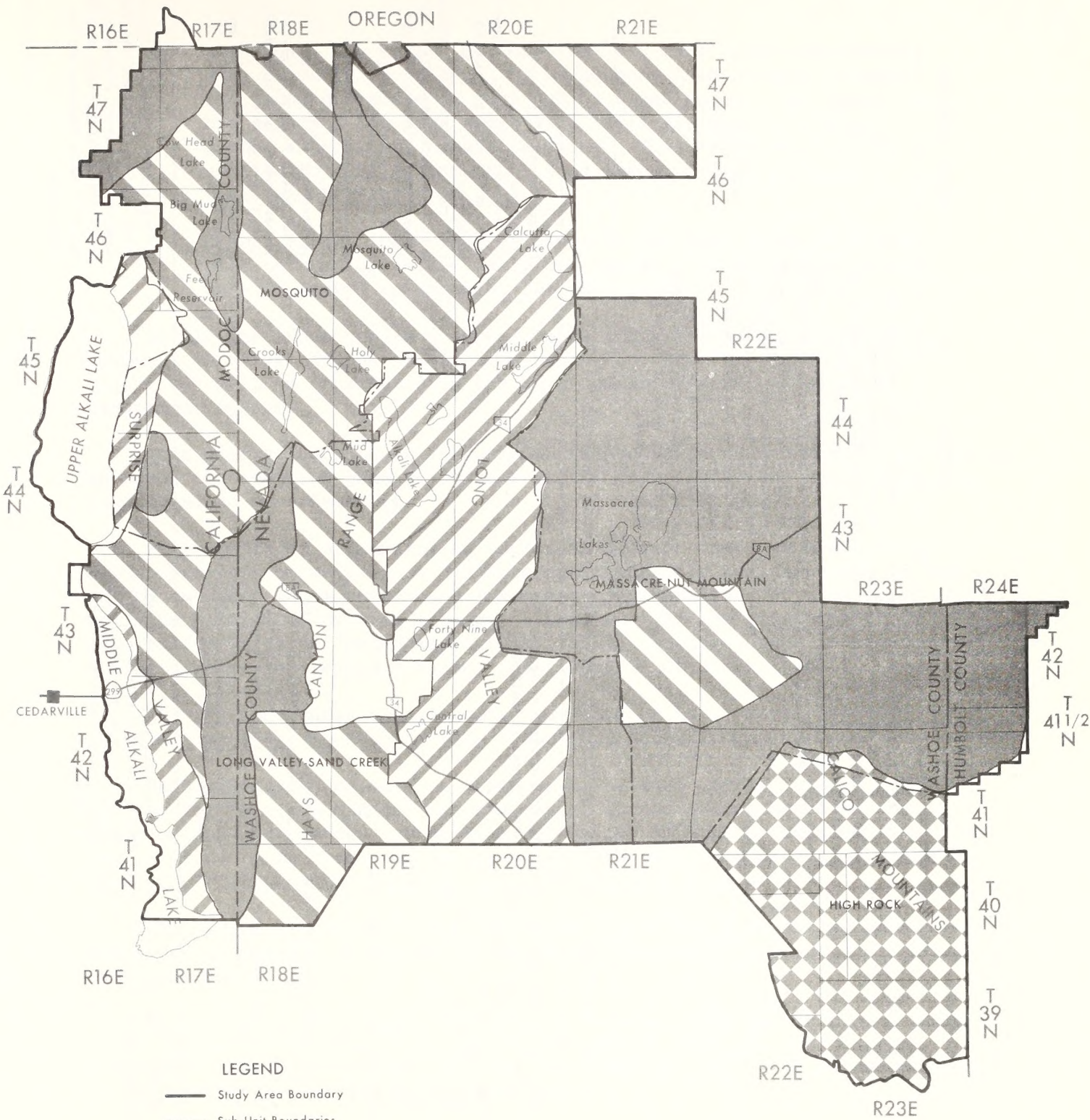
(8) Land treatments will be developed in accordance with the guidelines described in TABLE 4-1 as applied to Sub-Unit 3 in the Proposed Action and all sub-units in all other alternatives (MAP 4-1). Land treatments will not occur until the lands have been cleared through wilderness review.

This measure will ensure that land-treatment-related impacts that have been identified for wildlife, cultural resources, and wilderness values are reduced to insignificant levels.

(9) In Sub-Unit 3 where the proposed grazing management system has been determined to be infeasible (p. 3-70 and 3-71) the prescriptive treatment that will be followed are described below. These treatments have been designed to meet vegetative and wildlife needs and, at the same time, allow for development of management systems that fit the physiography of the sub-unit.

- (a) Mountain Brush. Mountain brush types in the Sand Creek Allotment will be managed to provide two growing seasons of rest out of three years.

This prescription will ensure adequate rest and low enough utilization to improve vigor and seed production for bitterbrush and maintenance of sufficient browse to meet big game needs.



MAP 4-1

TABLE 4-1
LAND TREATMENT GUIDELINE
WILDLIFE CATEGORIES

WILDLIFE AREAS	BIG GAME	SAGE GROUSE	RAPTORS	HABITAT CONDITION
All Areas	<ol style="list-style-type: none"> 1. No brush removal within 1/4 mile of antelope kidding grounds. 	<ol style="list-style-type: none"> 1. 300' buffer zones will be left around meadows and streams in brush removal or seeding areas. 2. Burning may be used to improve meadow condition. 	<ol style="list-style-type: none"> 1. Buffer zones will be left around rimrock areas. 2. Leave 2000 acres untreated Big sagebrush within 1.5 miles of any active eagle or falcon eyrie (untreated areas will be based on topography and natural configuration of jackrabbit habitat) these areas will be designed to maximize edge effect. 3. No land treatment implemented prior to 6/15 in areas within one mile of eagle or falcon eyries. 	
ANY LAND TREATMENT WILL BE DONE TO ENHANCE THE NATIVE VEGETATIVE QUALITIES.				
B.	<ol style="list-style-type: none"> 1. Follow the antelope guidelines for seeding development. 2. Allow only early spring sprays to avoid killing bitterbrush on deer winter areas. 3. Treatment areas shall have leave areas of 20%-40% of total area. 4. Seeded areas shall have a seeding mixture of 10% alfalfa. 	<ol style="list-style-type: none"> 1. Follow western states sage grouse guidelines. 	<ol style="list-style-type: none"> 1. Consistent with habitat management plans. 2. Seedings will not be done on areas which will respond to management. 3. Burns or sprays will only be done to reduce competition on grasses and palatable shrubs. 	
C.	<ol style="list-style-type: none"> 1. Treatment areas shall have leave areas of 10%-20% of total area. 2. Seeded areas shall have a seeding mixture of 10% alfalfa. 	<ol style="list-style-type: none"> 1. Adhere to western states sage grouse guidelines. (A limited number of marginal grounds may be considered as in area D; (Importance will be evaluated by state Fish and Game and BLM biologists) 	<ol style="list-style-type: none"> 1. Seedings will be done on areas which will not respond to management in a reasonable period of time. 2. Burns or sprays (same as above). 	
D.	<ol style="list-style-type: none"> 1. Seeded areas shall have a seeding mixture of 10% alfalfa. 	<ol style="list-style-type: none"> 1. Evaluate on a case by case basis. (Areas within 2 miles of strutting grounds, not meeting nest habitat requirements may be treated. 	<ol style="list-style-type: none"> 1. Vegetative treatments in these areas will be designed to create maximum amounts of forage for the study area. Mitigating measures would be less restrictive in these areas. 	

- (b) Low Sage - Big Sage. Low sage and big sage sites associated with mountain brush types in Management Area 3A will receive two growing seasons of rest out of three years. All other big sage and low sage sites will, as a minimum, be rested during alternative growing seasons. This criterion will be applied to four allotments: Sand Creek, Calcutta, Horse Lake, and Little Basin.
- (c) Desert Shrub. Desert shrub sites in the Sand Creek Allotment will be used as either early use (April 1 to April 30) or late use (October 1 to November 30) each year.

In all the above vegetative types, topographic features, livestock movement patterns, forage utilization zones, and land-use goals and objectives will be considered in the development of workable grazing management systems.

This mitigation measure is designed to provide a reasonable and systematic approach for revising grazing systems in the proposed action which have been determined to be infeasible.

The impacts of attempting to implement systems that, at best, would allow operators to maintain a feasible operation only two years out of four due to extremes in elevation and irregular configurations of management areas, would be eliminated by this mitigation measure. At the same time, this measure will provide for vegetative and all other resource needs in keeping with the priorities and resource values identified in Chapters 1 and 2.

(10) Turnout dates on allotments may vary up to 15 days, depending upon phenological stage in keeping with prescribed sub-unit goals.

This mitigation measure is designed to allow a certain amount of flexibility for the land manager in determining turnout dates based on annual phenological differences. Potential vegetative impacts of turning livestock out prior to range readiness in unusually late years and potential economic impacts of delaying turnouts during early years will be averted.

(11) Light utilization designated for Area 2E will be mitigated to moderate utilization on grasses or light utilization on bitterbrush, whichever comes first.

This measure will reduce the adverse economic impacts associated with light use by allowing an additional 3,250 AUMs in Area 2E. The grazing management system in Area 2E, coupled with moderate use, will be sufficient to accomplish the desired multiple-use goals.

(12) Phase-in implementation will be used as a method for easing into management systems and thereby lessen economic impacts on livestock permittees associated with reductions in use.

- (a) Turnout dates. During the first cycle of a rotation grazing system, the permittee will retain his existing turnout date. An initial delay in implementing later turnout dates will allow development of early-season forage by the permittee or the Bureau.

During the second cycle the permittee will not be allowed to turn his livestock out earlier than May 1 on native range.

During the third cycle the permittee will not be allowed to turn livestock out earlier than the specified date for the management area.

- (b) Pastures. During the first cycle the entire allotment will be made available for use through a deferred-rotation system. Rest-rotation systems will be implemented during the second cycle of the grazing system.

Implementation of these mitigation measures will reduce the severe economic impacts of the proposed action to a level where essentially all of the operators could maintain stable operations while, at the same time, a trend toward range improvement will be initiated in keeping with specified land-use goals and objectives.

CHAPTER 5

UNAVOIDABLE ADVERSE IMPACTS

Chapter 5

UNAVOIDABLE ADVERSE IMPACTS

The adverse impacts identified below are those which would occur as a result of implementation of the proposed action after application of the mitigation measures discussed in Chapter 4. Further mitigation would not be performed owing to: (1) technological limitations; (2) compromising of higher priority resource goals expected to be attained by the proposed action; or (3) excessive cost.

SOILS

Adverse impacts would occur during the initial grazing cycle of rest-rotation systems. The degree of impact would be reduced as the cycle progresses, although livestock grazing would result in continued utilization of forage, influencing soil loss, decreased available water capacity, and soil productivity.

Reseeding the 268 acres disturbed during construction of water facilities and fences (TABLE 3-6) would decrease soil erosion/sediment production in the immediate area of the facility or fence but would not result in a significant reduction of soil erosion or sediment production areawide.

Use pastures during the first cycle or two would have soil losses within 40-60 percent of acceptability. Thereafter, increased vegetative cover and litter accumulation as a result of revegetation under moderate use would provide the required protection on those ecological sites having the productive capacity to attain a 60-percent cover or greater.

For the first two cycles of rest-rotation systems, use pastures would receive some adverse impacts from soil compaction and attendant decreased permeability and water-holding capacity. The effect would be most pronounced on bare ground. However, the soil would be subject to seasonal structural restoration by freeze-thaw action. Some compaction would assist in planting seeds for subsequent germination.

Non-intensive management in Management Area 4A could result in all of the adverse impacts identified above, although potentially intensified in degree. As grazing formulas would not be developed by BLM, degrees of impact cannot be quantified. Specification of season of use and forage utilization limits might be expected to improve the long-term aspect of range conditions, but the rate of improvement is unpredictable.

WATER

Impacts on water resources from impacts on soils would continue throughout the grazing management areas, persisting through the first few grazing cycles but decreasing thereafter to levels measurably different from existing levels.

VEGETATION

Short-term impacts would occur during use treatments. Individual pastures grazed during the spring and summer would exhibit a reduction in plant vigor, reproduction, litter accumulation and seedling establishment. These short-term adverse impacts would be offset by prescribed rest and overall vegetative condition would improve on most areas.

Heavily utilized browse species in Management Areas 3B and 4B would receive inadequate rest for recovery of vigor and reproductive abilities. Adverse impacts would be expected to occur on less than 5 percent of the area.

Improvement in vegetative condition and trend would be slowed in the short-term as a result of the phase-in mitigation. However, in the long-term, the degree of improvement would approach that predicted prior to mitigation.

Construction and development of livestock facilities would result in short-term vegetative disturbance from off-road vehicles and construction equipment. Disturbance would affect approximately 500 acres.

Additional livestock water sources would lead to new livestock concentration areas causing trampling damage and loss of vigor of heavily utilized shrubs on these areas.

LIVESTOCK GRAZING

The primary adverse impact on livestock grazing would be the loss of about 12,000 AUMs areawide (see TABLE 1-3) and the setback in spring turnout dates.

Implementation of grazing systems would result in short-term weight losses and disorientation of livestock. Established grazing patterns and customary areas of use would be altered.

Combining of allotments would cause increased livestock handling costs and combination of several herds might promote crossbreeding or the transfer of disease between herds.

Time and manpower spent for maintenance of fences and water developments and herding and caring for livestock would increase.

WILDLIFE

Terrestrial Animals

Land treatment projects would result in declines in nongame bird and small mammal diversity and abundance on 21,000 acres.

Increased water development, while reducing the degree of impact around concentration areas, will increase the number of concentration areas. Some areas (830 acres) that previously received little or no use by livestock will become concentration areas, thereby reducing their value to wildlife.

Wildlife population responses would follow the responses of vegetation. Increases in diversity and density of most species would be slowed in the short-term.

Eighty-seven miles of new fencing would interfere slightly with deer and antelope movements resulting in occasional injury or mortality.

Aquatic and Riparian Habitats

Small amounts of riparian habitat along ephemeral streams on Eight-, Nine-, Ten-, and Eleven-Mile Creeks would not reach their potential as wildlife habitat. Land ownership and the ephemeral nature of these areas make it more prudent to concentrate protection on perennial streams on public land (88% of which will be protected).

Threatened or Endangered Animal Species

No known adverse impacts are anticipated on threatened or endangered species.

WILD HORSES

There is a potential for horses to collide with or become entangled in pasture and enclosure fences. These impacts would be insignificant and relatively short-term since it would be expected that horses would become accustomed to new fences within several years.

CULTURAL RESOURCES

In all areas tolerating grazing, cultural sites would continue to receive varying degrees of livestock-related (trampling) impacts. The effects of diffuse trampling could extend to a large number of the approximately 18,000 sites predicted to lie within the grazing management areas, and a fraction of these would receive more intense trampling at locations where livestock congregate. While implementation of the proposed mitigation measures would result in avoidance of adverse effects on 13 known properties of National Register quality (and while the remaining 27 such properties would not be affected without mitigation), a large number of potential (but so far unidentified) National Register quality properties would continue to be affected by trampling until they were recognized through the inventory program and until adequate protection measures were advanced. All such losses in information content would be permanent and irretrievable.

RECREATION

Adverse impacts on recreational use would be of low intensity and would not significantly change the present recreation resource values. The chief impacts would result from pasture and enclosure fencing; where cattle guards or walkover ramps were not provided, recreational movement would be blocked or restricted.

Unnatural visual contrasts created by livestock forage consumption along fence lines would be particularly noticeable along the margins of grazing exclosures (especially at water developments). Reduced visual quality would result at new water developments where concentrations of livestock would defoliate the landscape immediately surrounding the water source.

WILDERNESS

Loss of wild horse and burro viewing opportunities in Sub-Units 1 and 2D, continued vegetative modification, trampling of archaeological sites, and visual impacts from continued livestock grazing in most areas would create some unavoidable adverse impacts on these wilderness values.

SOCIAL AND ECONOMIC CONDITIONS

There would be no additional significant impacts on socio-economic conditions resulting from the proposed mitigation. The impacts reported in Chapter 3, Socio-Economics, would be substantially reduced through mitigation.

CHAPTER 6

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTION

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT
AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

This chapter analyzes the trade-offs between short- and long-term productivity of individual resources involved in the proposed action (TABLE 6-1). For this analysis, "short-term" refers to the period of time required to achieve grazing proposal objectives (20 years after implementation), and "long-term" refers to the period beyond 20 years in which the proposed action's adverse or beneficial impacts would still occur.

TABLE 6-1
SUMMARY OF TRADE-OFFS: SHORT-TERM vs. LONG-TERM PRODUCTIVITY

RESOURCE	SHORT-TERM	LONG-TERM	TRADE-OFFS	NET EFFECT ON THE NATURAL ENVIRONMENT OVER THE LONG-TERM
Soils	Soil loss would slightly increase from construction & concentration of livestock in pastures.	Increased vegetation production & ground cover would result in a significant long-term reduction in soil loss.	The short-term loss would be traded for a long-term overall reduction in soil loss after management objectives are met.	Improvement
Water Resources	Water quality would decline slightly because of the temporary increase in soil erosion.	Reduced sediment yield, slower runoff rates, & more on-site water recharge would result in a long-term improvement in water quality in all perennial streams in the ES area.	The initial decline in water quality would be traded for a long-term improvement in water quality.	Improvement
Vegetation	Approximately 500 acres would be disturbed during construction of fences & water development & approximately 21,000 acres of native rangeland would be eliminated during the development of seeded areas. Approximately 42,000 AUMs of livestock forage would be consumed annually during initial years of the grazing systems.	Vegetative cover would recover on disturbed areas. Seeded areas, if successful, would provide approximately 5,000 AUMs of high-quality livestock forage, primarily crested wheatgrass. Plant vigor, reproduction, seedling establishment, and litter accumulation would increase & overall range condition would improve. Useable vegetation for livestock, wildlife, and other consumptive uses would increase.	The short-term disturbance of vegetation would be traded for a significant long-term increase in vegetative production. Slightly slower resource improvement would be traded for reduced economic impacts.	Improvement

TABLE 6-1 (continued)

RESOURCE	SHORT-TERM	LONG-TERM	TRADE-OFFS	NET EFFECT ON THE NATURAL ENVIRONMENT OVER THE LONG-TERM
Wildlife	The proposed action would directly stimulate wildlife population increases as a result of reduced grazing intensity and duration. Water developments would increase habitat available for wildlife use, thus increasing wildlife production and survival. Populations would generally increase. Short-term livestock concentrations on riparian vegetation would severely limit its growth and reproduction, thus reducing its fish and wildlife value.	Increasing wildlife populations would stabilize with habitat stabilization. Species inhabiting ungrazed riparian areas would increase significantly.	Continued livestock grazing would restrict wildlife populations from reaching optimum natural levels. However, the proposed adjustment of turnout dates, stocking rates, season of use, & use levels would enable wildlife to achieve significant improvements over existing conditions.	Improvement
Wild Horses	New pasture and enclosure fences would slightly disrupt wild horse movement patterns.	Horses would become accustomed to new fences. Improved range condition & increased forage availability would improve the health & condition of wild horse herds.	Short-term adverse impacts on horse movement would allow grazing systems to be established and range improvement to occur.	Improvement

TABLE 6-1 (continued)

NET EFFECT ON THE
NATURAL ENVIRONMENT
OVER THE LONG-TERM

RESOURCE	SHORT-TERM	LONG-TERM	TRADE-OFFS	
Livestock	Livestock would not be able to graze the range during the early spring. There would also be a reduction in livestock numbers on most areas during initial years. There would be a short-term reduction in livestock weights. Livestock handling and maintenance costs would increase.	Forage production would improve, allowing livestock use to significantly increase above present levels. A long-term increase in calf weaning weights, percent calf crop and cow weights would be anticipated.	The short-term reduction in livestock numbers would be traded for increased vegetative cover, improved wildlife habitat, watershed protection, increased water quality and recreation opportunities, and a reduction in the loss of cultural and historical resources.	Improvement
Archaeological	The proposed action would be entirely beneficial to cultural resources in the High Rock Sub-Unit & in Management Area 4D. Elsewhere continuance of the grazing regime would result in minor (but irreversible) impacts from diffuse trampling on all archaeological sites, save those fenced to exclude livestock.	In the long-term, improvement of range conditions through the application of systematic grazing management would result in a reduction in erosion, contributing to the stabilization of site surfaces. The inventory & monitoring systems would further enhance long-term productivity; each year more sites would become known & more appropriate, specific measures could be designed to ensure optimum management of them.	Livestock grazing would continue to disturb archaeological sites in small but cumulatively damaging proportions. Improved range condition & livestock enclosures resulting from the proposal would substantially reduce this adverse impact.	Stabilization of Sites
Visual Resources	Construction of range improvements would create visual intrusions having their greatest impacts in the short-term.	Vegetative growth would lessen visual impact, although all projects would have some impact as long as they exist.	Adverse short-term impacts would be traded for a long-term overall visual improvement resulting from an increase in vegetation and consequent reduction in soil erosion.	Improvement

TABLE 6-1 (continued)

NET EFFECT ON THE
NATURAL ENVIRONMENT
OVER THE LONG-TERM

RESOURCE

SHORT-TERM

LONG-TERM

TRADE-OFFS

Recreation

Most recreation opportunities would improve. Construction of range facilities would interfere with some hunting, hiking and sightseeing.

The long-term improvement of wildlife habitat, visual resources, & water resources would improve recreation opportunities.

Expected long-term improvement in the quality of recreational activities would far outweigh short-term disturbance of hunting, hiking, and sightseeing.

Improvement

Wilderness

Reduce grazing will have positive impact on wilderness values by improving vegetation, wildlife populations, water quality, and reducing soil erosion and trampling of archaeological sites. Additional developments in certain areas, though required to adhere to interim management guidelines, would nonetheless have some visual and environmental impact on the natural setting.

Improvement of vegetation, wildlife, water quality, and reduction in soil erosion and archaeological trampling from reduced grazing would enhance wilderness values.

Expected long-term improvement of environmental quality would far outweigh short-term impacts from some additional developments.

Improvement

Economic Conditions

Permittees would lose income as a result of decreases in allowable livestock use. Construction of range facilities, however, would add money to the local economy.

The grazing capacity of the ES area would increase as the range improves. Percent calf crop and weaning weights would also increase. In the long-term permittees would increase their earnings.

Short-term reduction in licensee income would be traded for long-term increases in income for those ranchers still operating when range conditions improve.

Not Applicable

TABLE 6-1 (Continued)

TABLE 6-1 (continued)

RESOURCE	SHORT-TERM	LONG-TERM	TRADE-OFFS	NET EFFECT ON THE NATURAL ENVIRONMENT OVER THE LONG-TERM
Social Conditions	<p>The historical structure of the Surprise Valley, dominated by the family-owned cattle ranch, would be in jeopardy as permittees are forced into uneconomically sized operations or forced out of ranching altogether. The trend towards larger, often outsider-owned, ranches would be expedited. Local values of esteem for the family rancher would suffer.</p>	<p>Assuming the loss of smaller, family-owned ranches, the contribution of this group to the Valley's social milieu would decline. A lower level of identification with the ranching community would affect the non-ranching community. Opportunities for local young people to take over the family ranch would decline, possibly speeding the emigration of local youth to economically greener pastures elsewhere.</p>	<p>Short- and long-term deterioration of the Valley's social structure would be traded for improved habitat conditions on the public lands.</p>	Not Applicable

CHAPTER 7

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Chapter 7

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable commitments of resources occur when a wide range of future options is foreclosed. By devoting a geographic area to a particular set of uses, it is possible that the values of that area for all uses would be lessened or completely lost.

Two sorts of resource commitments are considered in this chapter. "Irretrievable commitments" refers primarily to those resources present in a fixed quantity over some designated period of time. Once such a resource is used, it is not replaceable within the timeframe chosen, if at all. "Irreversible resource use" applies more to a process of usage. After an irreversible commitment is made, and use initiated, this particular use would continue for a designated length of time.

Time is a factor in both types of resource use. Very few of the management proposals would irreparably commit planning area resources for all time. However, most projects planned for the 20-year life of the proposal would represent irretrievable and irreversible resource commitments during this period.

Considering the level of use the planning unit has experienced over the last 130 years, the proposal would involve very few irreversible or irretrievable commitments of resources, especially after range improvement is well under way. The more pronounced commitments would affect the following resources.

SOILS

Soil loss would be irretrievably committed as a by-product of proposed range facility construction and vegetative manipulation. Streambanks, meadows, and other sensitive environmental areas left unfenced and unprotected under the proposal would result in irreversible and irretrievable soil losses.

VEGETATION

Seedlings of native range with introduced species (e.g., crested wheatgrass) would constitute an irreversible commitment of land and vegetation for the life of the seedlings. However, over a longer period of time, these areas might revert to native conditions if they are not maintained.

LIVESTOCK GRAZING

The proposed level of livestock reductions would create a deficit between current and proposed forage consumption. The reduced levels of forage consumption for livestock would be an irretrievable and irreversible loss to livestock during the 20-year life of the proposal.

After the range improves licensed grazing use could return to those levels licensed before the proposal's implementation; there would be no loss to the permittees over present use of forage.

Historical allotment boundaries and areas used by each permittee's livestock would be irreversibly lost if the proposed management areas and grazing systems are implemented.

WILDLIFE

Implementation of the proposed action would not result in any irreversible or irretrievable commitment of wildlife populations.

CULTURAL RESOURCES

All unmitigated impacts on cultural resources are irreversible, although their continued effect may be curtailed by subsequent adjustments in management. All losses of information, irrespective of the nature of the impacting force, constitute an irretrievable commitment of the resource base. Of approximately 20,000 predicted archaeological sites within the planning unit, about 18,000 would continue to be subject to some degree of disturbance and could thus, to varying degrees, be permanently altered.

WILDERNESS

Implementation of the proposed action would not result in any irreversible or irretrievable commitment of wilderness values as long as interim management policy is adhered to.

SOCIAL AND ECONOMIC CONDITIONS

If implemented, the proposal would generate an irreversible loss of public land forage to ranches in the planning unit. To the extent that individual ranchers would not be able to alter their management to offset this loss, irretrievable commitments in the form of lost rancher incomes would result. If the economic losses could not be minimized, and if the affected ranchers elected to leave the ranching business and the valley, this would be an irretrievable loss to the Surprise Valley community.

CHAPTER 8

ALTERNATIVES TO THE PROPOSED ACTION

Chapter 8

ALTERNATIVES TO THE PROPOSED ACTION

Several basic assumptions were made consistently through the analysis of impacts in all the alternatives.

- (1) Manpower and capital would be available to implement and monitor the management programs;
- (2) Any necessary wild horse reductions would be made before full implementation of management systems;
- (3) Impacts would be monitored and management adjusted as necessary based on increased data availability; and
- (4) Forage utilization targets would be adhered to.

ALTERNATIVE 1 - CONTINUE PRESENT MANAGEMENT

Description

Under this alternative the present level of allotment management within the planning area would be continued. The basic assumptions of this alternative are as follows:

1. Grazing would be managed with no change in pattern of livestock use, class of livestock use, or season of use. Present grazing use is shown in Chapter 1, TABLE 1-3 and Chapter 2, TABLE 2-9.
2. Current allowable use/unit forage consumption (AUMs) would remain at existing levels as shown in TABLE 8-1.
3. Wild horse and burro levels would be maintained at existing levels.
4. There would be no additional staffing needs.
5. Range improvements would consist of developing or maintaining 10 water sources/year. No other additional range improvements will be authorized.

Impacts

Soils

Present erosion rates (TABLE 3-1) will continue under this alternative. The rate is 1.2 Tons/Acre.

TABLE 8-1
Forage Consumption Summary
Alternative 1

	<u>AUMs</u>
Livestock	56,730
Wild Horses	10,386
Antelope	1,741
Deer	3,705
Bighorn Sheep	<u>0</u>
TOTAL	72,562

Water

The quantity of runoff water will increase under the present management. This will mean less water available for soil water recharge and for interflow to the deeper ground water. Water quality will remain the same or deteriorate further. Turbidity and sediment load will slightly increase or, at best, remain constant.

Vegetation

Vegetative Condition and Trend: Present management consists primarily of season long grazing from early spring to mid or late summer. Exceptions are the Massacre Lake and Crooks Lake allotments, which currently have grazing systems, and the North Larkspur allotment which is grazed during the fall. These exceptions will be discussed separately.

Except for the above mentioned allotments, vegetation on most of the land area would remain unchanged. The acres in poor condition would decrease from 403,000 to 389,000; acres in fair condition will decrease from 437,000 to 430,000 and the acres in good condition will increase from 6,000 to 27,000 (TABLE 8-2).

Although most trend plots evaluated in 1977 indicated downward trends, it is felt that this was a reflection of drought conditions during 1976 and 1977. By comparing the estimated forage production from range surveys conducted in 1963 (49,329 AUMs) with estimates of present production based on Anderson's (1978) stocking rate guides (47,355 AUMs) and actual use and utilization data (48,408 AUMs) it is felt that vegetative condition and production has stabilized on most of the area. Livestock concentration areas (i.e., the aspen/slender wheatgrass, tufted hairgrass-bluegrass and the Willow/tufted hairgrass-bluegrass sites) would continue to receive very heavy grazing pressure under continuous use and vegetative condition would continue to decline.

Sampson (1952) reports that early spring grazing results in depletion of livestock forage almost directly proportional to the grazing intensity. Unless an allotment is so conservatively stocked to leave a large portion of the seed heads ungrazed, continuous season long grazing will not result in revegetating depleted areas. Cook (1966), also recognizes the importance of periodic rest or deferment during the growing season (April 15 to July 15) and reports that desert plants cannot tolerate continuous heavy grazing during this period.

Early spring grazing also leads to physical and mechanical damage. Trampling during early spring may damage forage if soil moisture contents are high. The effects of trampling and pulling out of plants may at times be more detrimental than close grazing (Sampson, 1952).

TABLE 8-2

Range Condition in 20 Years with Alternative 1
(Acreage by Condition Class)

	Poor (Acres)	Fair (Acres)	Good (Acres)	Excellent (Acres)	Miscellaneous
Sub-Unit 1	10,737	66,732	0	0	11,554
Sub-Unit 2					
Area A	7,125	9,800	0		475
Area B	2,861	15,221	4,135		403
Area C	6,028	14,303	12,466		1,853
Area D	5,352	915			1,793
Area E	41,777	138,114			5,574
Sub-Unit 2 Total	63,143	178,353	16,601		10,098
Sub-Unit 3					
Area A	69,194	38,440			33,530
Area B	118,284	21,005	24		19,687
Sub-Unit 3 Total	187,478	59,445	24		53,217
Sub-Unit 4					
Area A	39,440	9,256			3,030
Area B	32,892	41,760	10,281		9,870
Area C	55,418	74,036			3,238
Sub-Unit 4 Total	127,750	125,052	10,281		16,138
Study Area Total	389,108	429,582	26,906	0	91,007

Development of additional water sources on non-AMP areas would improve livestock distribution and allow more uniform utilization of vegetation on an allotment basis. However, new water sources would serve as livestock concentration areas and the condition of vegetation heavily utilized adjacent to these areas would decline. A concurrent reduction of grazing use near existing water sources would tend to reduce the size of existing heavy use areas and vegetative conditions distant from these water sources would improve. Overall, there would be no change in range conditions resulting from increased water development under continued grazing systems (TABLE 8-3).

Continuation of existing grazing systems for Massacre Lake and Crooks Lake Allotment will result in moderate vegetative improvement.

Additional water development will allow the grazing system to be followed as designed on the Massacre Lake Allotment and range improvement will occur. Two native range pastures will be grazed after boot stage for two successive years followed by rest for two years.

Insufficient rest is provided for complete recovery of plants that are heavily utilized. Areas which are close to water or which receive greater than 50 percent utilization will not improve. The condition on approximately 50 percent of the area of the wetter, more productive ecological sites would be anticipated to improve (TABLE 8-3). These sites contain sufficient amounts of perennial grasses and forbs or contain high soil moisture properties which will allow more rapid recovery than other sites.

Three pastures consisting of all or part crested wheatgrass seedings are grazed during the early spring two successive years followed by two years grazing in June or July. Sharp (1970), indicates that this degree of rest may be sufficient to maintain the vigor of crested wheatgrass provided that grazing during the early spring is terminated soon enough to allow significant regrowth. This use, however, will not be adequate for maintenance of native range near concentration areas.

Continuance of the Crooks Lake AMP would result in an overall improvement of the vegetation over the next 20 years. The AMP is a 10 pasture system. Six pastures are in a deferred rotation system with two successive years deferment after seedripe use during two years of growing season. Three pastures are used as supplemental forage and a tenth pasture is used continuously for horses and bulls.

Range condition would improve on a portion of the area grazed under the deferred rotation system. Two years of deferment until seedripe following use during two consecutive growing seasons does not provide adequate rest to restore plant vigor of heavily utilized plants (Hormay, 1970). Only those areas that are used moderately or lightly will improve in condition. Those areas that are adjacent to water or livestock concentration areas will be grazed heavily even with moderate use restrictions and are not anticipated to improve significantly. Tufted hairgrass-

TABLE 8-3

VEGETATIVE CONDITION IN 20 YEARS WITH ALTERNATIVE 1

Ecological Site	Non AMP Areas	Crooks Lake & Massacre Lake AMPs	Fall Grazing Areas
1. Shadscale/Indian Ricegrass	Poor	Poor	Poor
2. Greasewood/Basin Wildrye	Poor	Poor	Fair
3. Greasewood-Rabbitbrush/ Basin Wildrye	Poor	Poor	Poor
4. Low Sage/Sandberg Bluegrass	Fair	50% Fair, 50% Good	Good
5. Low Sage/Bluebunch Wheatgrass	Fair	50% Fair, 50% Good	Good
6. Low Sage/Idaho Fescue	Fair	N/A	Good
7. Juniper-Low Sage/Idaho Fescue	Poor	50% Poor, 50% Fair	Fair
8. Big Sage/Bluebunch Wheatgrass- Indian Ricegrass	Fair	Fair	Fair
9. Big Sage/Bluebunch Wheatgrass	Poor	50% Poor, 50% Fair	Fair
10. Big Sage/Idaho Fescue	Fair	N/A	Good
11. Big Sage/Basin Wildrye	Poor	50% Poor, 50% Fair	Fair
12. Juniper-Big Sage/Bluebunch Wheatgrass	Fair	50% Fair, 50% Good	Good
13. Bitterbrush/Idaho Fescue	Poor	50% Poor, 50% Fair	Poor
14. Mountain Mahogany/Western Needlegrass	Fair	N/A	Fair
15. Silver Sage/Mat Muhly	Poor	50% Poor, 50% Fair	Fair
16. Baltic Rush	Fair	50% Fair, 50% Good	Fair
17. Aspen/Slender Wheatgrass	Poor	Poor	Fair
18. Tufted Hairgrass-Bluegrass	Poor	Poor	Good
19. Willow/Tufted Hairgrass- Bluegrass	Poor	Poor	Fair

bluegrass, willow tufted hairgrass, and the drier ecological sites should remain in their present condition class. Approximately 50 percent of the area of the wetter, more productive sites will improve in condition (TABLE 8-3). The three supplemental pastures, primarily private meadows, are in good condition now and will remain in good condition over the next 20 years.

Impacts of fall grazing on the North Larkspur Allotment would be the same as described for Management Area 3B in Chapter 3. The condition of most sites would improve one condition class (TABLE 8-3).

Vegetative disturbance during the construction phase of water developments would be as described in Chapter 3.

Vegetative Production: With the exception of the AMP areas and the North Larkspur Allotment forage production will remain unchanged. The total forage production for the study area will increase from approximately 55,000 AUMs to 64,500 AUMs over a twenty year period (TABLE 8-4). As a result of range condition improvement on the Massacre Lake Allotment forage production will increase by approximately 700 AUMs. Forage production will increase by approximately 2,600 AUMs on the Crooks Lake Allotment and by 200 AUMs on the North Larkspur Allotment. Since range conditions are expected to remain essentially unchanged on the remainder of the area, the forage production will also remain unchanged.

Threatened and Endangered Plants: Potential impacts would remain unchanged on all areas except the Crooks Lake, Massacre Lake, and North Larkspur Allotments. On these areas, impacts would be beneficial if plants should occur because of the periodic rest, deferment or fall grazing these allotments provide.

Livestock Grazing

Implementation of this alternative would result in a short term improvement in livestock performance primarily as a result of providing additional water. Development of additional water sources will improve livestock distribution. Livestock weight gains and performance will improve because livestock trailing requirements will be reduced. Also, the quantity and quality of livestock forage on areas currently poorly watered is better than on areas presently grazed. It is anticipated that livestock weights would increase by approximately 5-10 percent for a 5-10 year period. As vegetative condition declines near new water sources (see Vegetation) the benefits gained from the availability of additional forage will be lost. In 20 years livestock weight gains and performance will not be significantly different from present levels.

Livestock management practices (herding, trailing, etc.) would basically remain unchanged. Maintenance costs for additional water sources would increase.

TABLE 8-4

VEGETATIVE PRODUCTION WITH ALTERNATIVE 1

<u>AREA</u>	<u>PRESENT AUMs</u>	<u>AUMs IN 20 YEARS</u>
<u>Sub-Unit 1</u>	6,434	6,023
<u>Sub-Unit 2</u>		
Management Area A	1,225	1,246
Management Area B	956	1,452
Management Area C	1,617	2,275
Management Area D	400	435
Management Area E	<u>14,742</u>	<u>15,453</u>
TOTAL	18,940	20,861
<u>Sub-Unit 3</u>		
Management Area A	4,800	4,851
Management Area B	<u>6,424</u>	<u>6,701</u>
TOTAL	11,224	11,552
<u>Sub-Unit 4</u>		
Management Area A	2,121	3,750
Management Area B	5,401	8,943
Management Area C	<u>12,802</u>	<u>13,396</u>
TOTAL	18,374	26,089
STUDY AREA TOTAL	54,972	64,525

As forage condition improve on the Massacre Lake, Crooks Lake and North Larkspur Allotments, it is anticipated that livestock use on these areas would increase by approximately 3,800 AUMs in 20 years.

Wildlife

Continuing present livestock management will result in the perpetuation of the poor habitat conditions which exist throughout Cowhead/Massacre. Nevada Fish and Game (1978) states; "Obviously, grazing represents the single largest conflict with wildlife values in the Cowhead/Massacre Planning Units." Bighorn sheep would not be reintroduced under continuation of present management due to potential disease transmission.

Deer: Deer habitat would be expected to continue to deteriorate. Forage competition between deer and livestock would remain severe for bitterbrush and spring forbs and grasses. Poor fawn survival and some winter adult loss would result in no population change. Decadent bitterbrush stands would continue to die without replacement, mature bitterbrush plants would continue to decline in vigor, bluegrass-sedge, aspen, and willow/ bluegrass sites would exhibit major deterioration and loss, and deer habitat quality would be poor. Deer populations would fluctuate but remain about 1,800.

Antelope: Antelope habitat would be expected to continue to deteriorate and antelope-livestock competition would remain strong for forbs and browse.

Poor fawn survival would hold the population to current numbers (1,200).

Sage Grouse: Competition for food and cover on meadows and nest disturbance and destruction would continue to inhibit sage grouse productivity. Gradual deterioration of meadows would slowly decrease the habitat carrying capacity for sage grouse, and populations would slowly decline.

Quail: Continuous livestock grazing in riparian areas would inhibit the growth of shrubs required for quail cover. Habitat would continue to decline, and would nearly be eliminated. The quail population would decline and possibly be eliminated after 20 years.

Nongame Species: Continuous grazing would have adverse impacts on nongame species. Continued disturbance of ground-nesting birds would continue to inhibit reproductive success of these species. Nongame animal populations would be expected to remain near current levels. Livestock grazing would cause the destruction of meadow, aspen, and willow riparian areas which are critical to the interspersions of habitats which makes species diversity possible. After 20 years of continuous grazing, nongame species would be expected to decrease.

Aquatic Habitat: All aquatic habitat would continue to be degraded. Conditions described in Chapter 2 will continue with a slow rate of deterioration. Excessive removal of stream bank vegetation and stream bank deterioration will make all streams marginal or unsatisfactory for the production and maintenance of native fish populations.

Range Facilities: The impacts of water developments would be as discussed in Chapter 3 for the Proposed Action.

Wild Horses and Burros

Implementation of this alternative would have minimal impacts on the present wild horse and burro population. If herd composition and sex ratios are not artificially manipulated, horse populations will continue to increase approximately 15-20 percent annually. Periodic reductions will be required to maintain current numbers.

Construction of fences around spring developments will interrupt present use patterns. No death losses are expected and horses should adjust within one or two years.

Development of additional water will slightly improve wild horse distribution and trailing distances to water will be reduced.

Existing allotment fences between the Board Corral, Sagehen, and Massacre Lake Allotments will continue to restrict horse ranges and impede wild horse movement.

Cultural Resources

A large number of approximately 16,000 predicted archaeological sites would be subject to diffuse trampling (see Chapter 3), and those located near water would suffer from concentrations of livestock (intense trampling). Forty known properties of National Register quality could receive varying degrees of adverse effect, and 13 of these, located where livestock are known to congregate, would continue to receive intense trampling.

Recreation

Recreation use would not be significantly impacted.

Visual Resources: The area's overall aesthetic quality would not change significantly.

Wilderness: Continued present management would adversely impact wilderness resources by continuing to deteriorate the natural character of the landscape. Livestock trample vegetation and archaeological sites, particularly around water sources, increase soil erosion and compete with wildlife for forage. Livestock and stock developments cause visual impacts offensive to some visitors within WSA's. Continued present grazing practices would perpetuate this degradation of the environment.

Socio-Economics

With no change in permitted grazing use, 56,730 AUMs would continue to be allocated to the planning unit's permittees. This forage would provide spring and summer feed for approximately 50 percent of the permittees' estimated 24,650 cow herd. The economic viability of at least 25 of the 34 permittees' operations will continue to depend upon the public lands, both as a feed supply and as a space in which to run their cattle while their private meadowlands are in production.

With continuation of present management, public lands would remain a major component of most of the permittees' annual feed schedule. Increases in production costs on home ranches and low swings in feeder beef prices would continue as limiting factors for ranch operations. If past trends are indicative of what may occur in the future, some ranch consolidation will continue so that there would be fewer but larger livestock operations than at present. However, in this area, the trend toward consolidated ranches would be moderated by the durability of long-established family operations.

Mitigation

Cultural resource inventories will continue to be conducted on a site specific basis. Cultural resources determined to be eligible for nomination to the National Register will be evaluated for possible impacts from grazing and water developments. Appropriate action will be taken per 36 CFR 800 in consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation.

No other mitigative measures will be instituted.

Unavoidable Adverse Impacts (Future Environment without the Proposal)

Soils and Water Quality

A substantial decrease in water quality and increase in soil loss can be expected as over 50 percent of the area would experience accelerated erosion. Livestock concentration areas would continue to receive heavy impact and remain in a state of reduced productivity. Streambanks would be further deteriorated by trampling.

Vegetation

The acreage of each condition class of vegetation is not expected to change substantially from present conditions. In areas of early turnout and season-long grazing, vegetation production and vigor will bring about changes in species composition and overall range deterioration. Vegetation in livestock concentration areas will continue to decline.

In allotments where grazing systems are in effect, slight improvement in vegetative condition may result; however, overall average condition class and acreage of ecological sites will remain unchanged.

Where vegetation will not be allowed to regain vigor and carbohydrate reserves, production and carrying capacity would decrease.

Livestock Grazing

Livestock numbers, weight gains, and performance would not be significantly different from present levels.

Wildlife

Bighorn sheep would not be reintroduced into Sub-Unit 1.

A continued downward trend in habitat condition is expected. Moderate competition for browse between deer and livestock would continue in all areas containing preferred browse species. Spring competition for forbs will continue. Deer populations are expected to be at or slightly below present levels and antelope numbers should remain near current levels.

Sage grouse populations may decline, and quail populations would either remain small and isolated or be eliminated altogether. Nongame species densities and diversity would decline and stabilize at lowered levels.

Wild Horses

Wild horse numbers would remain unchanged.

Cultural Resources

Cultural resources throughout the study area would be substantially depleted from their present condition. Attrition from livestock grazing, vandalism, and erosion would be cumulative and irreversible.

Wilderness

Unavoidable adverse impacts to the wilderness resource will be directly proportional to the impact on soils and water quality, vegetation, wildlife, cultural resources, and scenic values. Unavoidable deterioration of these resources would persist if present management practices continue.

Socio-Economic Conditions

No significant changes in the social or economic characteristics of the planning unit is anticipated.

ALTERNATIVE 2 - ELIMINATION OF LIVESTOCK GRAZING

Description

Under this alternative, all existing grazing privileges and cooperative agreements would be terminated by 1982. The purpose of this alternative is to reserve all available forage and resource values for uses other than livestock grazing. Analysis of this alternative is based upon the following assumptions:

1. Fencing around each block of private land to be grazed must be constructed by landowners to prevent livestock from straying onto public lands.
2. There will be no new range improvements and existing improvements, such as water developments, would be maintained for the benefit of wildlife and wild horses.
3. Wild horse populations would be removed from the study area. Forage allocation (AUMs) would be as shown in TABLE 8-5.
4. The BLM will continue to manage public lands for all other multiple uses as mandated by the Federal Land Policy and Management Act of 1976.
5. No mitigating actions will be instituted other than monitoring of the range, control of wild horses, and surveying for cultural resources where fencelines are to be removed.

Impacts

Soils

Impacts of this option on soils and water would be positive and significant. After 20 years the rates of erosion would be reduced 30-60 percent in all sub-units.

Water

The increase in vegetative cover would result in a reduction in surface runoff and an increase in evapotranspiration rates. Increased infiltration would be expected during the first 20 years, being most significant during the five years following termination of grazing. The decrease in runoff and sedimentation would result in improved water quality. Sediment in water would be reduced from 33 to 45 percent.

Vegetation

Vegetation Condition and Trend: Impacts of the alternative on vegetation would primarily be as described for the livestock grazing exclusion areas in the proposed action. Noticeable improvement in range condition would be evident within 20 years, primarily as a result of increased vigor

TABLE 8-5
Forage Consumption Summary

Alternative 2

	<u>AUMs</u>
Livestock	0
Wild Horses	0
Antelope <u>1/</u>	4,759
Deer <u>1/</u>	<u>5,042</u>
TOTAL	9,801

1/ Represents actual quantity of livestock AUMs allocated for big game use. Due to dietary differences, the quality of forage for big game may be the limiting factor on populations. Actual use may therefore be less than the allocation.

of livestock forage species. The density of grasses and forbs which were at a competitive disadvantage because of grazing would increase. Increases in density (number of individual plants per unit area) of species reproducing by seed would be slower than the proposal on some sites due to limited seedling establishment under no grazing conditions (Sampson, 1913). Robertson (1971) found that a sagebrush-grass range in Northern Nevada that was ungrazed for thirty years had significant vegetative improvement. The cover of perennial forbs increased 85 percent, Thurbers needlegrass increased seven times, and bluebunch wheatgrass was reestablishing naturally in favorable locations. Only annual forbs and locoweed declined.

Increasing wild horse use by 100 percent will prevent range improvement on some areas. Sub-Units 1 and 2, which contain approximately 85 percent of the horse use, would be most adversely affected. The remainder of the area would not be significantly affected due to the limited horse numbers and large acreages involved. Within Sub-Units 1 and 2, horses would consume approximately 18,000 AUMs of forage annually. This use would prevent vegetative improvement near frequently used water sources and on concentration areas. It is estimated that vegetative improvement would not occur on 50 percent of the spring and meadow communities and 20 percent of the remaining sites.

In 20 years the acres in poor condition will decrease from 403,000 to 171,000; the acres in fair condition will decrease from 437,000 to 235,000; the acres in good condition will increase from 6,000 to 438,000 and the acres in excellent condition will increase from 0 to 2,000.

Vegetation Production: Cancellation of livestock grazing provide an immediate increase in livestock forage production by approximately 28 percent (Hormay, 1970). As range conditions improve, the forage production is expected to increase by approximately 130 percent in Sub-Units 1 and 2 and by 230 percent in units 3 and 4. Forage production would increase from the present level of 55,000 AUMs to 176,417 AUMs. Increases in forage production were calculated using Anderson's (1978) stocking rate guides.

Threatened and Endangered Plant Species: Cancellation of livestock grazing would probably result in beneficial impacts to species occurring within the study area. In some cases, impacts could possibly be adverse if those climax species or other species that increase through lack of livestock grazing competed for space occupied by any threatened or endangered plant species. This would depend entirely upon the plant species, the plant community it occurs in, and the level the community occupies towards climax. In most situations that could exist, impacts will be beneficial since in most instances a threatened or endangered species population will not be above what it would attain in a climax or near climax situation.

Livestock Grazing

All grazing would cease.

Wildlife

All present and potential conflicts between livestock and wildlife in Cowhead/Massacre will be eliminated. Bighorn sheep could be successfully reintroduced into Sub-Unit 1. Deer and antelope may initially expand to the point of degrading their own habitat. Further pressure will be placed on deer and antelope as vegetation approaches climax, as both are subclimax species.

Removal of 175 miles of fence on public lands will reduce the potential for deer and antelope injury and mortality caused by contact with fences. Reduction in mortality will not result in significant recruitment to the herd. Some fencing of private lands would occur and deer and antelope would be adversely effected though not significantly. The greatest potential for adverse impacts exist in Management Area 4A where small tracts of public land are intermingled with private land.

Deer: Elimination of livestock grazing will provide about 48,000,000 pounds of additional forage per year. Deer populations will expand, possibly beyond reasonable numbers. (See Chapter 1, "Relationships of the Proposal to the MFP" for definition of reasonable numbers.) These population expansions, may result in degradation of habitat condition. Deer prefer subclimax successional stages. Elimination of livestock grazing would remove one means of maintaining these subclimax stages. Deer populations would increase to 2,450.

Antelope: Additional forage will affect antelope in much the same way as deer. Antelope population expansions may also exceed reasonable numbers, and eventually lead to habitat degradation. Antelope numbers would reach 2,200.

Sage Grouse: Sage grouse would benefit from increased forage and cover and decreased disturbance of nests by livestock. Sage grouse would increase significantly.

Meadows, a key sage grouse habitat, will improve dramatically in condition but vegetation will eventually become extremely rank and sage grouse use for feeding will decline. Oakleaf (1971) states that the declines in use are due to a combination of the following factors:

1. Dense vegetative stands contain few food forbs.
2. Increased energy expenditures are required for movement in dense vegetation.
3. Reduced vision might make a feeding sage grouse more susceptible to predation.

Vegetative manipulation would be required to maintain these increased sage grouse populations.

Quail: Elimination of livestock grazing would allow the optimum growth of willows and other shrubs required for cover by quail. Large increases in quail would occur in localized riparian areas.

Nongame Species: Elimination of grazing will allow the most natural ecological nongame habitat conditions to develop. Each habitat type will be allowed to develop without periodic partial modification or destruction. Habitat types will become more distinct and supply a much wider variety of habitat conditions with small mammal and bird use increasing.

Raptors: Increases in small mammal and bird populations will provide increased prey resulting in greater raptor production. However, increased protective cover for prey will also occur. Raptor populations would not be expected to change significantly.

Aquatic Habitat: Aquatic habitat will increase at a maximum rate. Vegetation will increase on stream banks resulting in stream channels stabilization, water quality improvement, decrease in sedimentation of stream gravels, and increase in stream shading.

Wild Horses and Burros

All wild horses and burros would be eliminated.

Cultural Resources

The effects on cultural resources of the termination of livestock grazing would be entirely beneficial. The impacts of both diffuse and concentrated trampling will be eliminated, and with the anticipated increase in natural vegetation and reduction in erosion, condition trends of all sites would improve.

Removal of 175 miles of existing fence could result in adverse effects on cultural resources transected by fencelines, particularly if the removal were a mechanized operation.

Recreation

Cancellation of grazing would beneficially impact all recreational activities within the study area. Scenic quality would improve as range plant density increase and riparian areas experience regrowth. Hunting opportunities would also improve with the expected increases in wildlife. Restoration of climax conditions along the Lassen/Applegate Emigrant Trail would enhance the viewer perception of landscape conditions which prevailed when the trail was in use.

Visual Resources: The overall visual quality of the EIS area would moderately improve. Natural revegetation of riparian areas, meadows, springs, and aspen stands would create the most apparent beneficial visual impact.

Wilderness: Elimination of livestock grazing would greatly improve wilderness resources. Wildlife populations, water quality and vegetation would improve. Grazing improvements could be removed and disturbed areas rehabilitated. Impacts from grazing activity would be eliminated. The overall quality of wilderness experience would be greatly enhanced.

Socio-Economic Conditions

Alternative 2 would have a severe adverse impact on the economic and social environment of the planning unit. Of the 26 permittees living in Modoc County, at least 20 would be affected to the extent of possible bankruptcy. Of the eight remaining permittees based outside of the county, seven may be forced out of their present style of operation. The less affected permittees have such low dependencies on the planning units' grazing resources that the elimination of their permits would not create severe disruption in their operations.

Applying the effects of the no grazing alternative to the model ranch developed in Chapter 3 (APPENDIX G) TABLE 8-6 illustrates the disastrous impact of this alternative on the area's cattle ranches. The elimination of federal grazing would reduce the available revenue after the annual operating costs have been paid from 70 to 112 percent.

The economic structure of the planning unit would change significantly if federal grazing permits were eliminated. Since about 60 percent of the retail trade in Cedarville is to local livestock ranches, eliminating or seriously curtailing the purchasing power of about half of the valley's livestock ranches would cut sales volumes of the local business by about 30 percent.

If no replacement feed were developed, the no grazing alternative might decrease the county's total livestock sales (11.1 million dollars in 1977) by about 1.2 million dollars (11 percent).

The no grazing alternative would, therefore, have serious effects on the local economy. Additional costs from this alternative would arise from the loss of most use of the scattered, deeded land in the planning area that is now being used as holding or gathering pens or as additional pasture by the permittees. Fencing of the larger private holdings to prevent cattle from straying onto the public lands would be expensive (fencing one section (640 acres) could run about \$7,920 at BLM rates (calculated to be \$1,980 per mile (BLM, 1978)) relative to the forage supply on these private ranges.

TABLE 8-6

NET REVENUES AFTER PAYMENT OF ANNUAL CASH COSTS -
PRESENT SITUATION AND UNDER THE NO GRAZING ALTERNATIVE -
500 COW OPERATION

Ranch Response	Annual Net Revenues	Present Value of Discounted Stream of Net Revenues Over 20 Years			
		@ 6½%		@ 12%	
		\$	% Change	\$	% Change
Present Situations	\$20,397	\$239,349		\$170,365	
Leased Pastures	\$ 6,054	\$ 71,041	- 70%	\$ 50,646	- 70%
Developed Irrigated Pasture	\$ 1,584	\$ 18,587	- 92%	\$ 13,251	- 92%
Bought Hay	-\$ 2,496	-\$ 29,289	-112%	-\$20,881	-112%
Herd Reduction	\$ 3,831	\$ 42,608	- 82%	-\$30,376	- 82%

The social impacts of the no grazing alternative would be equally significant. Perhaps 20 local ranches would be forced to close down a business and a lifestyle that has prevailed, in some cases, for 100 years. Many ranches would be converted to hay or other crop production. However, the large capital expenditures necessary to convert meadowlands to croplands and the poor equity position of at least half of the permittees would make the conversion of cattle ranches to economically sized farms financially impossible for some of the ranchers. If continued beef or hay production is not possible, it is probable that the affected permittees would sell their operations. In most cases, changes from beef to crop production are accompanied by changes in land-ownership (Knight, 1976; Pierce, 1978). It could be expected that Alternative 2's adoption would result in new people coming into the valley, with accompanying disruption in a social environment that has roots stretching back more than 100 years.

Mitigation

No mitigation measures are proposed for this alternative.

Unavoidable Adverse Impacts

The unavoidable adverse effects of elimination of grazing on public lands would severely reduce the viability of a range livestock economy within the EIS area. Such action would lead to the loss of some ranches and increased difficulty of operating others. There would be an overall decline in total ranch employment, loss of personal income, and reduced ranch values.

Livestock would have to be shifted to other lands or eliminated from the productive pool of the area. These actions would mean a loss of total livestock production, more intensive use of private lands, more acres in cultivation, and greater dependence on harvested forages.

Fencing of private lands will inhibit wildlife and wild horse movement. Construction of new fencing on private lands and removal of fences on public lands would result in adverse impact on cultural resources transected by fencelines.

Annual grazing fee revenues of approximately \$110,000 will be lost. The loss of grazing fees will reduce the funds available for range improvements and maintenance. There would also be some reduction in staff.

ALTERNATIVE 3 - PROPOSED ACTION WITH ECONOMIC ADJUSTMENTS

Description

This alternative includes all components of the Proposed Action as described in Chapters 1 and 4, plus economic compensation for seven years to those ranchers facing reduction in AUMs on the public lands.

This alternative would achieve the conservation objectives of the proposed action at a lower cost to livestock permittees and the Surprise Valley Community. Providing economic compensation to the permittees, is an attempt to ease the sudden transition from 56,730 AUMs to 39,970 AUMs of livestock use on the public lands. The U. S. Congress would have to enact new legislation to grant BLM authority to compensate grazing permittees for these reductions.

The compensation would be of two types: (1) A single-payment grant to be paid at the time of implementation of this alternative to the operators in Sub-Unit 1 due to the permanent cessation of grazing there--the grant would pay \$50 per permitted AUM, totalling approximately \$250,000; and (2) annual payment to the other operators for AUM reductions at the private grazing land lease rate for AUMs for the 11 Western States, as reported in Farm Real Estate Market Developments (U. S. Dept. Ag., Econ. Research Serv.). These payments would be made under one of two conditions. First, they must support feed-producing improvements on the rancher's base property. These improvements must be part of a Soil Conservation Service (SCS) approved ranch management plan. Or, second, where feed-production improvement opportunities do not exist (subject to SCS verification), the payments would be applied to the purchase of livestock feed to sustain the ranch operation. No payments would be made after the seventh year, even if the operators were not back up to 1978 use levels. The formula for computing payments would be: $\text{AUM Difference} \times \text{Private Grazing Land Lease Rate}$ (estimated to be \$8/AUM for 1978).

These payments would be the lesser of: (A) The difference between 1978 licensed AUMs and use licensed under this alternative; or (B) The difference between 1978 licensed AUMs and the use projected along a straight line from the first year to the twentieth year for each operator, derived from TABLE 1-3. The overall difference is shown in FIGURE 8-1.

Assuming the straight line projections are used and the private grazing land lease rate is \$8 per AUM, the payments would be as shown on TABLE 8-7.

Overall, Cowhead/Massacre operators would receive grants of \$250,000 and payments of \$248,000 for a total of \$498,000. When the cost of range improvements is included, this alternative would cost the U. S. Government approximately \$1,848,000 to implement.

FIGURE 8-1

Difference Between 1978 Licensed Use and 20-Year Projected Use
(In AUMS)

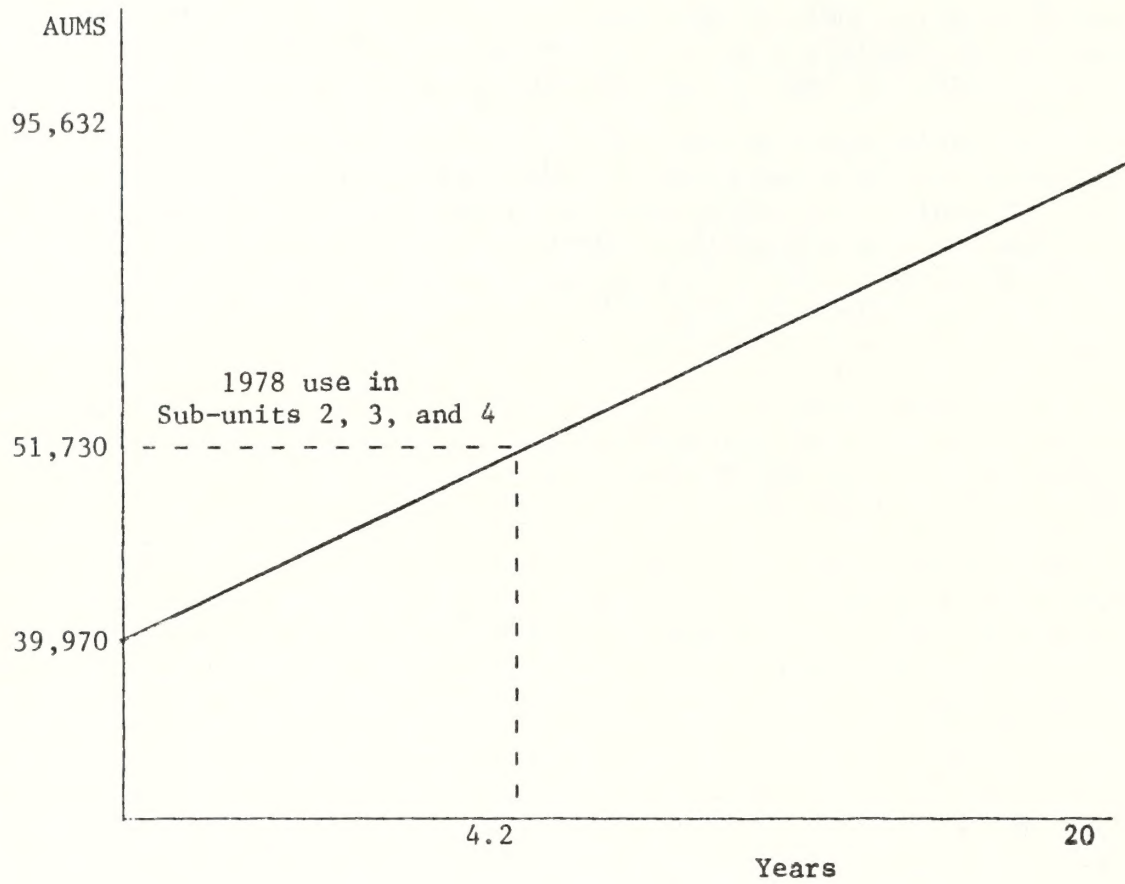


TABLE 8-7

Projected Annual Compensation to Operators for AUM Reductions

<u>Year</u>	<u>Calculated AUM Difference</u>	<u>Payment (\$8/AUM)</u>
1	11,760	\$ 94,080
2	8,977	\$ 71,816
3	6,194	\$ 49,552
4	3,411	\$ 27,288
5	628	\$ 5,024
6	0	<u>0</u>
Total		\$247,760

Impacts

All impacts of this alternative on resource values except socio-economic conditions would be exactly as described for the Proposed Action in Chapters 3 and 5.

The economic impacts on operators resulting from this alternative would be less than those shown in Chapter 3 due to the payment to them of approximately \$498,000. This would not be sufficient for the operators to replace the lost forage. Even in Sub-Unit 1, where the operators would be granted \$50 per licensed AUM, the estimated cost of replacement feed in perpetuity would be greater than the compensation. For the operators receiving annual payments at the private grazing land lease rate (approximately \$8 per AUM lost each year), the cost of replacing the feed as shown in Chapter 3 would be greater than the compensation received under this alternative.

The beneficial aspects of this alternative for the ranching community, compared to the proposed action, would be less economic disruption in adjusting to a period of reduced public land grazing, and development of permanent feed-producing improvements on ranchers' base properties. Most of the operators would probably initially reduce their herds somewhat, although the amount of herd reduction would depend upon livestock market outlook. Tying the payments under this alternative to improving base ranches would provide an incentive to the affected operators to actually increase the production capability of their ranches and to stay in the livestock business. Those operators who do not have improvement opportunities, presumably a small proportion, would be better able to purchase replacement feed. The \$8/AUM would not purchase an equivalent amount of hay because hay at \$50 (Chapter 3) per ton would be \$11 per AUM.

If the range productivity improved more rapidly than the straight line projection and the operators were licensed for more use, the annual payments would be less than the estimated \$248,000. If, on the other hand, the range responded more slowly the operators would receive only the \$248,000 in annual payments and would have to adjust to reduced public forage gradually over the seven-year payment period. There are no provisions for payments beyond seven years.

The payments in this alternative would prevent most, if not all, of the ranch sales discussed in Chapter 3. Those ranchers who would choose to sell their operation would not have to do so precipitously.

The effect on the Surprise Valley community would be less adverse than under the proposed action because there would be less of a reduction in income--fewer ranchers would choose to sell their ranches. The development of improvements on the base properties would tend to stabilize the community and the livestock industry by making them less dependent on the public range.

Mitigation

All mitigation measures described in Chapter 4 will apply to this alternative.

Unavoidable Adverse Impacts

The unavoidable adverse impacts, other than those on socio-economic conditions, would be as described in Chapter 5. The adverse economic impacts described in Chapter 5 would be reduced by the approximately \$498,000 to be paid to ranchers.

ALTERNATIVE 4 - LIVESTOCK OPERATOR MANAGEMENT PLAN

Description

This alternative was developed to meet the concerns of the affected livestock operators in the Cowhead/Massacre Planning Unit. It is similar to Alternative 1 in that no initial adjustments to stocking levels and seasons of use will occur except in Sub-Unit 1 (TABLE 8-8). As per the Modoc/Washoe Experimental Stewardship Committee's formal recommendation to the Susanville District, this alternative analyzes the proposal to eliminate livestock use east of the west-rim of High Rock Canyon in the Massacre Mountain Allotment and the entire canyon complex of Little High Rock Canyon. Cattle and sheep use would remain in the remainder of the Little High Rock Allotment and on the west side of High Rock Canyon in the Massacre Mountain Allotment. Approximately 23 miles of fence would be required to keep livestock from entering the canyons under this alternative.

It differs in that it emphasizes intensive monitoring prior to any action to adjust season of use or stocking levels. The monitoring system is also intended to identify any appropriate grazing system that might be necessary for an area. In addition, this alternative emphasizes selected range improvements: seeding, brush removal^{1/} and additional water development. Project development would cost approximately \$1,584,000.

This alternative is based on the following assumptions:

1. A monitoring system developed prior to implementation of this alternative will be established for determining range trend, use patterns, and other factors in each allotment. Monitoring will be accomplished by a team that includes BLM, State Fish and Game, University representatives, representatives of conservation groups, and permittees. Conditions will be reviewed and evaluated in the field at least every three years by the team. The existing Cowhead/Massacre soil survey will provide the basic soil and range site (ecological site) information. From this information the team will recommend to the District Manager the type and degree of change in range use.
2. Major grazing adjustments would be made only after new supporting facilities and cultural treatments are in use and vegetative and grazing effects have been carefully monitored and evaluated. No initial changes will be made in allotment boundaries or authorized use, including permitted AUMs, turn-out dates, season of use or classes of livestock. However, temporary adjustments (e.g., to meet needs of the range improvement schedule) will, if necessary, be worked out mutually between the permittee and bureau officials. Vegetative treatment projects will be maintained by either retreatment or providing grazing management systems designed to satisfy plant requirements so that the original productivity will be maintained.

^{1/} Five methods of brush removal being considered are: spraying, burning, plowing, brush beating and chaining.

TABLE 8-8
Forage Consumption Summary
Alternative 4

	<u>Proposed (AUMs)</u>
Livestock	54,150
Wild Horses	2,556
Antelope*	2,176
Deer*	3,725
Bighorn Sheep	<u>120</u>
TOTAL	62,727

* Represents allocation of livestock AUMs to big game. Due to dietary differences, quality of forage for big game may be the limiting factor and actual utilization may be less than the allocation.

3. Range improvements will include a minimum of:

- a. 21,600 acres of brush removal.
- b. 15,600 acres of seeding.
- c. 32 miles of fence construction.
- d. 1 mile of fence removed.
- e. 40 springs to be developed.
- f. 114 reservoirs to be constructed or repaired.
- g. 36 wells to be drilled and equipped.
- h. 6 1/2 miles of pipeline.
- i. 3 miles of stock trails to be constructed.
- j. 30 cattle guards where fences cross BLM marked roads and trails.

Approximate cost: \$1,584,000

Additional improvements may be considered for management of sensitive areas.

4. Coordinated resource plans (see GLOSSARY) will be developed for all allotments. Management systems will be designed to minimize fencing and emphasize middle to late successional stages, but will maintain a mosaic of all successional stages.
5. Wild horse numbers will be reduced and maintained at 1971 population numbers (142) and areas.
6. Grazing in High Rock Canyon would continue at present levels. Adjustments in level of use or season of use would be made if the monitoring effort demonstrates that negative impacts are occurring on archaeological, wildlife, or grazing resources. Wild horses will be excluded from the area.
7. The management of small allotments containing 25 percent or more private land will be determined with the consultation, coordination, and cooperation of the permittees involved. This includes the Upper Sand Creek, Gravelly, Bally Mountain numbers 1, 2, and 3, Warner Valley, Alkali Lake, North Cowhead, Scammon, Twelve Mile, Lartirigoyen, Nine Mile, and West Allotments.

Impacts

Soils

Until the first round of monitoring has been completed, present management practice will be continued. Rates of erosion by ecologic sites under present management have been presented in Chapter 2, TABLE 2-2. They range from 2.1 Tons/Acre per year to 0.5 Tons/Acre per year.

Development of springs, reservoirs, and wells will supply a more uniform distribution of grazing. Such a distribution would reduce erosion an estimated 5 percent.

For three years after spraying, brush beating, or burning, average annual soil loss will increase by 0.1 Tons/Acre per year. However, as grass comes in after three years, runoff will be decreased by 10 percent and erosion will be decreased by 5 percent. The use of a plow or a chain would create a similar situation. The soil loss during establishment of the grass is higher and will average 4 Tons/Acre per year. Once grass has been established, runoff will be reduced by 10 percent and the annual soil loss will be reduced to that of grass, 0.5-0.7 Tons/Acre per year. The five methods of brush removal mentioned in order of least ground disturbance to most ground disturbance are: spraying, brush beating, burning, chaining and plowing.

Persistence of phenoxy herbicides, 2,4-D in particular, are not expected to result in any adverse impacts to soil. Herbicides such as 2,4-D are highly susceptible to microbial decomposition in soils. Even at slow rates of decomposition, it would be unlikely for 2,4-D to persist into the succeeding year even at application rates much higher than normally used for range improvement (Scifres, 1977).

Water

Monitoring of uncertain results does not permit a prediction of suspended sediment load as a result of brush removal, with any degree of certainty.

Impacts of spraying on water quality in the study area are expected to be minimal and short term. Application rates needed for range improvement projects are low and non-toxic.

Surface water movement of herbicides is expected to be minimal. Highly water soluble formulations (e.g. 2,4-D) are usually moved into the soil with first moisture contact (rainfall). This would preclude any surface movement. Should herbicides be introduced inadvertently or directly into an impounded water system, the same general mechanisms (microbial decomposition) which take place in soils would apply in water (Scifres, 1977).

Vegetation

Vegetation Condition and Trend: The impacts of this alternative will be that, those portions of Sub-Unit 1 located east of the west rim of High Rock Canyon and the entire Little High Rock Canyon complex will improve to good/excellent condition in 20 years. The remaining portions of Sub-Unit 1 and of the study area would have impacts similar to those described in Alternative 1.

Development of additional water sources will not significantly affect overall range condition. Livestock use will be distributed over a larger area but livestock concentrations are anticipated near existing and proposed water sources. Vegetative trend will be downward near new water sources since they will be continuously grazed during the growing season each year (Cook, 1966; Hormay, 1970). The vegetative condition near existing water sources will remain in poor condition since livestock will continue to concentrate on these areas (Hormay, 1970).

Sampson, 1952, reports that continuous early spring grazing results in range depletion almost directly proportional to the intensity of grazing. Therefore, providing additional water sources will reduce the number of livestock and the forage consumption adjacent to existing water and the size of livestock concentration areas will be reduced and an upward vegetative trend is anticipated on areas distant from water. The offsetting downward trend on new water sources and the upward trend around existing water sources will result in little overall change in the condition class acreages. The increased production of land treatment areas will reduce grazing pressure on the remainder of the range and result in a reduction in the size of livestock concentration areas and improved range conditions on lightly utilized areas distant from water.

Land Treatments: Impacts of plowing and seeding would be as described in Chapter 3. Impacts resulting from chaining would be similar to plowing.

Burning approximately 4,200 acres will significantly alter the vegetative composition. Impacts will be variable depending upon which ecological sites are burned, the timing and intensity, vegetative composition prior to burning, and the livestock management practices followed after burning.

The major brush species to be considered for burning would be Artemesia tridentata var. tridentata, Artemesia tridentata var. wyomingensis, and Artemesia tridentata var. vasseyana, collectively referred to as big sagebrush. Burning results in a significant reduction or elimination in big sagebrush due to its inability to sprout following a fire. Burning big sagebrush-perennial bunchgrass sites in low, fair, or better condition has been shown to reduce big sagebrush while increasing densities of bunchgrasses thereby increasing livestock forage capacity for the site. The majority of perennial bunchgrasses are only slightly damaged or undamaged by late summer or early fall burning (TABLE 8-9). Their increased vigor and growth, after a fire, can increase forage by 75 to 98 percent (Blaisdell, 1953). Burning the same big sagebrush-perennial bunchgrass sites which are in a poor condition class could have a very negative effect on range sites in the study area. In areas where cheatgrass exists, poor condition sites and extremely dry sites, wild fires have resulted in pure stands of cheatgrass. Cheatgrass, an introduced annual, has the inherent competitive ability to close seral communities to perennial grass seedlings on disturbed sites (Young and Evans, 1978; Hedrick, Hyder, Sneva, and Poulton, 1966).

Bitterbrush can also be significantly reduced or eliminated by burning. Like big sagebrush, bitterbrush is a non-sprouter and can be totally eliminated by a hot burn. However, bitterbrush has been known to sprout basally following a cool fire (i.e., a spring burn).

The one perennial bunchgrass, found in this study area, which is severely damaged by burning is Idaho fescue (TABLE 8-9). Due to the dense concentration of leaves on Idaho fescue, a hot fire has the tendency to burn into the basal crown, which in turn kills the plant. However, as with bitterbrush, a cool fire will in most cases not harm this plant.

TABLE 8-9

IMPACTS OF FIRE ON FORAGE SPECIES

From the several range studies in the sagebrush zones in the northern intermountain region, range plant species are classified as to damage from late summer burning as follows (Valentine, 1971).

<u>Severely Damaged</u>	<u>Slightly Damaged</u>	<u>Undamaged</u>
Big Sagebrush	Bluebunch Wheatgrass	Arrowleaf Balsamroot
Bitterbrush	Indian Paintbrush	Cheatgrass
Curlleaf Mountain Mahogany	Indian Ricegrass	Crested Wheatgrass
	Needle and Thread	Douglas Sedge
Eriogonum	Nevada Bluegrass	Horsebrush
Idaho Fescue	Penstemon	Rabbitbrush
Thread Leaf Sedge	Prairie Junegrass	Sandberg Bluegrass
	Squirreltail	Serviceberry
	Lupine	Snowberry
	Tapertip Hawksbeard	Snowbrush Geothas
	Thurber Needlegrass	Sticky Currant
		Western Wheatgrass
		Yarrow

Note: - No literature could be found on the effects of a burn on Great Basin wildrye (Elymus cinereus).

TABLE 8-10

2, 4-D RESIDUES IN FORAGE GRASSES AT SEVERAL TIME PERIODS
FOLLOWING APPLICATION (Morton, 1967)

<u>Time Period Weeks</u>	<u>2, 4-D Residue ppm.</u>
0	100
1	60
2	50
4	30
8	6
16	1
52	0

Burn impacts on forbs have not been as researched as impacts on the brush and grass species. It is difficult to predict the impacts on annual forbs after a burn because of the variance in forb production from year to year. As for perennial forbs, with the exception of Eriogonum spp., burning does not severely damage these plants (TABLE 8-9).

Spraying approximately 17,000 acres will significantly alter vegetative composition and livestock forage production. The target species for phenoxy herbicides (primarily 2,4-D) will be competitive brush species (big sagebrush, rabbitbrush) and in some cases undesirable forbs species (e.g., poisonous plants; i.e., larkspur).

Phenoxy herbicides, such as 2,4-D, are non-selective in their affects upon broadleaf perennial plants. This will result in desirable broadleaf species being adversely affected when located in a treatment area. However, some selective control is possible by timing spray applications to periods when the desirable plants are least susceptible to such a spray (e.g., bitterbrush, see below).

2,4-D has been shown to be extremely effective in reducing or completely eliminating big sagebrush in treatment areas. A spray of big sagebrush-bunchgrass sites would have essentially the same affects, in terms of grazing capacity improvement, as burning.

Rabbitbrush and horsebrush can also be controled with proper applications of 2,4-D. Timing of the spray becomes much more critical when using 2,4-D for the control of these two species. There is a very short period of time when rabbitbrush can be sprayed and completely killed (Young and Evans, 1976; Hyder, Sneva, and Freed, 1962). Both species are capable of sprouting profusely, so if only a top kill is obtained the two species would be expected to remain on the site.

Bitterbrush is extremely susceptible to 2,4-D spray during its active growing season. However, big sagebrush-bitterbrush sites can be sprayed to reduce sagebrush densities while not effecting bitterbrush. This has been accomplished by spraying, during May, prior to any substantial leaf growth by bitterbrush (Sneva and Hyder, 1962; Young and Evans, 1979).

Forbs are very susceptible to all phenoxy herbicide sprays. 2,4-D would significantly effect any forbs sprayed during their active growing season. Forb densities would be reduced significantly depending on the timing of the spray with respect to the plants' growing season. With an increase in grass densities following a spray, forb densities could decline as a result of increased competition by perennial grasses.

Grasses are generally unharmed by spraying and production will generally increase on those sites where a seed source is available. Reduction of brush and forb species lessens competition for water and space thus allowing grasses, both annuals and perennials, to increase in density.

Research indicates that 2,4-D, when used with a water carrier, is biodegradable and that residues break down quickly.

Morton (1967) has indicated that one week following application of 1 pound per acre of 2,4-D to forage grasses, residues amounted to 60 ppm. Four months following treatment residue was reduced to 1 ppm, and one year after application no residue was detected (TABLE 8-10).

The use of brush beating for brush removal will have similar vegetative responses with burning and spraying. Brush beating, like burning, will not adversely effect forb densities for will it reduce rabbitbrush or horsebrush effectively. However, brush beating, like spraying and burning, effectively removes big sagebrush (Mueggler and Blaisdell, 1958). Brush beating will also leave litter on the ground for soil surface protection.

Range Facilities: Vegetative disturbance during the construction of fences and water developments would be as described in Chapter 3. Approximately 33 acres would be disturbed during fence construction and 250 acres disturbed during the development of water facilities. It is anticipated that cheatgrass would initially dominate disturbed areas with sagebrush invading and dominating the areas by the end of 20 years.

Vegetative Production: The vegetative production of native range will respond similarly to that described for Alternative 1. With the exception of the Massacre Lake and Crooks Lake AMPs little vegetative improvement or increase in vegetative production is anticipated. Because improved range conditions are predicted on these allotments (See Alternative 1) the live-stock forage production is expected to increase from 55,000 AUMs to 59,000 AUMs.

Land treatment projects will increase livestock forage production. As stated in Chapter 3, the production of the seeded areas was expected to be approximately 4 ac/AUM. Seeding 16,600 acres will, therefore, provide approximately 3,900 AUMs. Experience with previously sprayed and burned areas within the Susanville District indicate that livestock forage production increased from an average of 12 ac/AUM to 7 ac/AUM or an increase of approximately 5 ac/AUM. Burning and spraying 21,600 acres will increase forage production by approximately 4,300 AUMs. Combining forage increase from land treatment projects with increase due to range improvement, the forage production in 20 years will increase to approximately 67,000 AUMs.

Threatened or Endangered Plants: The impacts on threatened and endangered plants will be the same as described for Alternative 1. Proposed land treatment projects would require inventory and clearance prior to implementation to ensure that any threatened or endangered plant populations were not adversely impacted.

Livestock Grazing

Approximately 2,580 AUMs would be removed from livestock use as a result of no grazing in the eastern portion of Sub-Unit 1.

TABLE 8-11

RESIDUE LEVELS OF 2, 4-D FOLLOWING FEEDING AT TWO LEVELS
(Agriculture Research, USDA, 1972)

Animal	Feeding Level	Residue Level (ppm) after 24 Hours			Residue Level (ppm) after 7 Days		
		Muscle	Liver	Fat	Muscle	Liver	Fat
Cattle	2,000 ppm	.07	.22	.24	.04	.22	.28
Cattle	300 ppm	(*)	(*)	.13			
Sheep	2,000 ppm	.06	.98	.10	(*)	.27	.15
							.37

* No detectable residue.

TABLE 8-12

CHRONIC TOXICITY OF 2, 4-D
(Norris, 1971)

Organism	Dose mg/kg	Equivalent Concentration in Diet ^{1/} ppm	Duration Days	Effect
Cattle	50	500	112	None
Sheep	100	1,000	481	None

^{1/} Assumes food intake is 10 percent of body weight per day.

A short term improvement in livestock performance as a result of developing additional water sources and implementing brush removal, and seeding projects is expected on the remainder of the study area. Impacts associated with additional water development will be as described in Alternative 1. Developing seedings and brush removal projects will increase forage production by approximately 8,000 AUMs. Since livestock use will not be increased, the increase in quantity and quality of forage will result in increased weights and improved livestock performance.

Spraying will have no physical effect on livestock. Livestock would be excluded from spray areas during actual spraying and for at least one year following treatment. Norris (1971) found that 2, 4-D begins to degrade immediately upon application, is one-half gone in approximately two weeks, and has virtually disappeared by four months (TABLE 8-12) and further indicated that 96 percent of 2,4-D fed to sheep is excreted by the end of the third day. Experiments indicated no lasting harmful effects from ingestion of the herbicide.

Wildlife

With the exception of the impacts identified below, impacts on wildlife under this alternative would be the same as those identified under Alternative 1. Big game populations would remain static or show slight increases to 1,800 deer and 1,500 antelope.

1. Establishment of a monitoring system would have no direct impacts on wildlife.
2. Retaining existing allotment boundaries (except in Sub-Unit 1), authorized use, turnout dates, season of use, and classes of livestock will impact wildlife as described under the "no action" alternative.

Impacts on deer on the east side of High Rock Canyon would be essentially the same as for the proposed action. Numbers would increase from 35 to 45. Low sage sites in Sub-Unit 1 currently receive little or no livestock use. Meadow improvement following removal of livestock from the canyons would benefit the 150 antelope summering in the area, and support a 50 percent increase. Winter antelope populations would be expected to increase from 200 to 500.

3. Land treatments in general could significantly impact wildlife. However, adhering to the guidelines outlined in Chapter 4 will alleviate most adverse impacts and provide benefits to some wildlife species.

Leaving buffer zones around rimrock, meadows, streams, and antelope kidding grounds will ensure that the integrity of these crucial habitat types is maintained. Providing islands of untreated vegetation and maximizing "edge effect" will benefit most wildlife species.

Leaving untreated habitat surrounding eagle and falcon eyries and postponing treatment within $\frac{1}{2}$ mile of nests until after June 15, will ensure that productivity of these species is not jeopardized.

Requiring that any land treatment in Sub-Unit 1 be done to enhance native vegetative qualities will favor the enhancement of native wildlife habitat in an area where these values are extremely high.

Guidelines described in Chapter 4 protect all but one or possibly two low density sage grouse strutting grounds (less than 10 strutting males observed 1979 and 1980).

The primary impact of all types of land treatments will be an alteration of nongame wildlife species composition and a decrease in abundance resulting from changes in habitat structure and food supply. Project design with significant leave areas will minimize these impacts. The Nevada Department of Fish and Game (1976) states that: "sagebrush eradication programs can be designed to optimize numbers and availability of the prey base for large raptors."

Spray; Spraying with 2,4-D for release of native vegetation or as preparation for seeding is not expected to have any direct toxic effects on wildlife. Dost (1978) cites numerous studies involving chickens, ducks, cattle, sheep, pheasant, grouse, quail, rabbits, mice and several other laboratory animals. These studies unanimously showed no direct general toxicity, no effect on reproductive function (egg formation, embryo formation, development or survival), except under chronic exposure to concentrations many times normal field application rates, at least for terrestrial species. Other studies showed that 2,4D was rapidly metabolized and eliminated from the bodies of all animals studied (Dost, 1978). Cumulative effects on raptors and other predators are therefore not anticipated.

A reduction in forb density would be anticipated. However, long term response may be an overall increase in numbers of forbs. This, along with the increase in grass will benefit deer and antelope during the spring and early summer.

The maintenance of critical deer winter range will be ensured by timing sprays in these areas to take place before any significant leaf growth appears on bitterbrush (Young and Evans, 1979; Sneva and Hyder, 1962).

Nongame wildlife would be impacted by spraying, due only to changes in habitat structure. Savage (1977) found species diversity and densities in sprayed areas to be about one-half that found in unsprayed areas. However, leaving islands and maximizing edge effect will minimize these changes.

Burning: Burning as a method of brush removal will generally be conducted in the spring in small areas not containing significant bitterbrush. Burning may also be used as a means of manipulating key habitat types (i.e., meadows) to more productive seral stages. As such, burning will benefit wildlife species in general.

Larger burns on big sage sites would impact small mammals and nongame birds similarly to sprays. However, changes would be more significant due to the more total reduction in structure and less control of leave areas.

Seeding: Maintaining a 10 percent mixture of Nomad alfalfa and leaving 10 to 40 percent of the treatment areas as untreated islands and fingers of native vegetation, and not seeding key antelope winter-spring ranges will ensure the maintenance of adequate habitat to support at least reasonable numbers.

Design criteria listed in Chapter 4 will also ensure negligible impacts on sage grouse and raptors.

Deer winter ranges will not be seeded unless there is an opportunity to improve browse composition. Land treatment guidelines will ensure the maintenance of adequate thermal cover.

Seedings would alter on site small mammal and nongame bird richness and abundance. Deer mice will increase significantly and replace several other species. Jackrabbit use within seeded areas will decrease, but use along the "edges" will increase.

Horned larks will become the most abundant nongame bird. Sage sparrows and meadowlarks will decline but remain common. The majority of other species will be limited to the edges of the seedings or off-site.

Using seedings for April livestock forage will provide off-site benefits to all wildlife species by removing competition from native range during the earliest growth stages.

Impacts on nongame species resulting from chaining would be dependent upon the size of chain and the size of sagebrush to be chained. Projects could be designed for less than 100 percent brush kill which would maintain structure and diversity for wildlife. Initial impacts on forb composition would be positive. Antelope habitat could actually be enhanced in current low density areas where brush is over 30 inches tall (Antenreith, 1978).

While providing more total brush removal than chaining or plowing, brush beating would provide the most opportunity for project design and the best forb response.

4. The net increase of 31 miles of fence would present a minor impediment to large mammal movement. Fence construction will not affect small mammals and will provide improved perches for small birds.
5. Development of 40 springs, 114 reservoirs, and 36 wells will have mixed impacts on wildlife. Water distribution would be improved for wildlife as well as for livestock. The intensity of use surrounding individual water developments will be reduced. However, the number of concentration areas will increase, thus creating competition for food, water, and space in areas where none currently exists.

6. Emphasizing middle to late successional stages but retaining a mosaic of all successional stages will ensure the maintenance of high wildlife species diversity.
7. Reducing wild horse populations would involve removing approximately 50 percent of the horses in the unit and all from High Rock Canyon. This would release 6,000 AUMs of horse use, a portion of which could be utilized by wildlife and livestock. Reducing competition between wild horses and wildlife will improve habitat structure for small animals and improve the condition and productivity of larger game species.
8. Although forage may be allocated, continued sheep use of Sub-Unit 1 will reduce the potential for a bighorn sheep transplant. The Nevada Department of Fish and Game has expressed reluctance to reintroduce Bighorn sheep into areas occupied by domestic sheep because of the increased likelihood of disease transmission.

The two diseases of most concern are sore mouth and blue tongue. Both are viral diseases. Sore mouth could be transmitted through direct contact or contamination of water supplies in High Rock Canyon. Blue tongue is transmitted by an insect vector, making narrow buffer zones ineffective.

Bighorn sheep could be reintroduced east of High Rock Canyon with only moderate disease risks. The spatial separation between domestic sheep and bighorn would greatly reduce the danger of sore mouth transmission. Sore mouth could then only be transmitted if the water source draining into High Rock Canyon becomes contaminated or if the bighorn moved up Mahogany or Yellow Rick Canyons and came in contact with diseased domestic animals.

The degree to which this spatial separation reduces the possibility of bluetongue would depend upon the width of the buffer zone. Retaining livestock on the west side of the canyon during the spring and summer months when insect populations (bluetongue is transmitted between animals by a gnat) are high. This would provide a potential source for disease transmission. It is unlikely a bighorn transplant would occur until most other potential transplants in Nevada have been implemented and a surplus of bighorn becomes available.

Wild Horses and Burros

Wild horse and burro numbers for this alternative are given in TABLE 8-13.

The condition of those horses remaining is anticipated to improve slightly. Forage availability will increase slightly due to reduced wild horse numbers and the development of additional livestock forage through seeding, spraying, and burning projects. Spraying effects on wild horses will be similar to the impacts of spraying on cattle.

TABLE 8-13

WILD HORSE AND BURRO NUMBERS

<u>Present Number</u>	<u>Herd Management Area</u>	<u>Proposed Number</u>
432	High Rock	27
61	New Years Lake	36
270	Massacre Lake	79
TOTAL		
707		142

The development of additional water sources and maintaining existing allotment fences will have the same impacts as described in Alternative 1.

Since horse use is minimal on sites which are suitable for seeding, fencing around seedings would result in minimal impacts.

Cultural Resources

Because it proposes to defer decisions on specific modes of grazing management until the results of a monitoring system are returned, and because management directions responding to that system cannot be predicted, this alternative defies quantification of its impacts on cultural resources. In general, the interim continuation of present management would result in at least short term, irreversible adverse effects on cultural resources throughout the study area. Further, it offers no guarantee that these effects would not continue to accumulate in perpetuity. To the extent possible, the impacts of the major elements of the alternative are discussed below:

1. The establishment of a monitoring system to determine trend, use, etc., would have no effect on cultural resources.
2. Deferment of grazing adjustments, if any, would perpetuate for at least three years (and perhaps indefinitely) the accumulation of grazing related impacts on cultural resources throughout the study area. Approximately 16,000 cultural sites on public lands could be adversely affected.
3. All of the range improvements proposed under this alternative could be destructive to cultural resources unless preceded by cultural surveys and accompanied by adequate protective measures.
4. The development of coordinated resource plans throughout all allotments will consider protective measures for cultural resources of National Register quality, though degree of protection is unknown.
5. Reduction of wild horse numbers and maintenance at 1971 numbers would result in somewhat diminished impacts on cultural resources in those areas where wild horses are most concentrated, but attrition of information at open sites would continue.
6. The consent of permittees in the phasing of management of allotments with significant private lands would not insure that any cultural resources, regardless of their significance, would be afforded adequate protective measures. In fact, many places of extraordinary value might be compromised.

Recreation

Recreational use of the study area would not be significantly impacted in the short term by this alternative. Long term impacts will vary with the extent and location of range treatments and water developments.

Visual Resources: Impacts of this alternative on the area's aesthetic qualities will depend upon the extent and location of range treatments and water developments. The minimum number of improvements proposed in this alternative will create moderate negative impacts on visual resources. These impacts are similar to those of the proposed action. However, they will be cumulatively greater in this alternative.

Wilderness: Under this alternative numbers of livestock and seasons of use will be the same as under present management (Alternative 1). However, impacts will be slightly higher due to the greater number of proposed livestock improvements. Even with interim management compliance, some further visual and environmental impact will still affect the natural integrity of the affected areas. Significant reductions in wild horse and burro herds would also reduce horse and burro viewing opportunities.

Socio-Economics

Alternative 4 will adversely effect two livestock permittees in the Massacre Mountain Allotment (Sub-Unit 1). Both permittees would be assessed proportionate AUM reductions as a result of removal of grazing from the eastern portion of Sub-Unit 1, approximately 39,000 acres.

Bunyard would be reduced 1,935 AUMs from the Massacre Mountain Allotment. With his present 6 month season of use this reduction would result in a loss of approximately 324 head of cattle from his operation. This would be a 23 percent reduction in his current operation.

Alternative 4 proposes that no changes be made in the present season of use and that no reductions be made in cattle numbers in the remainder of the study area. These proposals are the same as those recommended under Alternative 1. Hence, the economic implications of this alternative for the permittees' ranches are indistinguishable from those outlined under Alternative 1 in the first few years following adoption of this alternative. Any future economic impacts would be based upon the results of the range monitoring and any mutually agreed upon changes in livestock use.

Ranch operating costs associated with using the public lands will increase by approximately \$25,000/year for the entire study area. This increase is due to the maintenance responsibilities for the development of an additional 40 springs, 36 wells, 31 miles of fence, and 30 cattle guards.

As stated in Chapter 2, past trends in the region's livestock industry have been towards fewer, larger ranches. This ranch consolidation has been composed of three major components: (1) local ranchers with smaller or more marginal operations will sell a portion of their base properties to raise capital to improve their equity positions. This leaves them with either smaller cattle ranches or forces them into specializing in crop or hay production; (2) buyers of these parcels have been either local ranchers with more sound financial resources who have expanded their base properties through land purchases or; (3) outside investors who have bought land for tax-evasion or speculative purposes.

The Surprise Valley would probably continue to be somewhat different than the rest of the region in the turn-over rate of ranch ownership. Ownership of the majority of the permittees' ranches has been in the same families for many years and, in some cases, generations. Hence, the dedication of the permittees is directed more to a life-style than to a way of making a living. The alternatives that propose no changes in grazing use (Alternatives 1 and 4), in combination with the next few years of predicted high beef prices, should stabilize ranch ownership patterns in the planning unit.

Economic benefits resulting from this alternative would be similar to those discussed under Alternative 1. However, gains in weaning weights and benefits from the increased utilization of the public range depend on many variables beyond the influence of BLM's land-use decisions. No numerical value can be placed on these potential benefits.

Mitigation

Each of the mitigation measures enumerated in Chapter 4 will be implemented if this alternative is selected.

Where fences intersect trails, appropriate devices will be installed to allow passage. Sensitive and critical habitat would be fenced. Disturbed areas will be reseeded to minimize soil loss.

Mitigation measures to minimize wildlife impacts include: creation of islands and fingers of native, untreated vegetation within revegetation areas, allowing no revegetation treatments within three miles of known sage grouse strutting grounds or antelope kidding areas; and, avoiding revegetation treatments in areas with bitterbrush.

A one-mile buffer zone between domestic livestock and the west rim of High Rock Canyon would be established.

Domestic sheep would not be permitted south of the north rim of Yellow Rock Canyon from May 1 to October 31, and not permitted east of High Rock Canyon at any time.

Unavoidable Adverse Impacts

Since the EIS area would continue to receive livestock-related impacts, the unavoidable adverse impacts under this alternative would be similar to those described under Alternative 1.

The unavoidable adverse impacts of vegetation manipulation are as described in Chapter 3. However, maintenance of vegetation treatment projects will prevent reinvasion of undesirable brush species.

Impacts on wilderness values would be slightly greater than those described under Alternative 1 because of greater numbers of proposed man-made features causing additional visual impacts despite adherence to interim management restrictions.

ALTERNATIVE 5 - EXTENSIVE CULTURAL TREATMENTS

Description

This alternative gives more consideration to minimizing short-term economic impacts than the Proposed Action and less consideration to degree and rate of resource improvements or protection. This "go slow" approach to improving ecological conditions proposes minimum livestock use reductions to maintain present social and economic conditions. It calls for an intensive capital investment program (\$3,245,000) to increase livestock forage production by vegetation manipulation and construction of new range facilities. Forage allocation would be as shown in TABLE 8-14.

Although aspects of this alternative are similar to present management and Alternative 4, it differs from both in that it includes some adjustments in seasons of use which will disrupt long established use patterns of livestock operators. These disruptions will be offset by a moderate increase in permitted use (23 percent).

This alternative proposes the following:

1. To increase livestock forage production by vegetation manipulation and construction of new range facilities, an intensive capital investment program totalling \$3,245,000 would be implemented.
2. About 110,000 acres would be burned or sprayed and seeded, 232 water sources would be developed, and 171 miles of fence would be constructed.
3. Wild horses would be eliminated.
4. Deer and antelope would be managed at "reasonable numbers." Details of this alternative program are described below.

Sub-Unit 1, High Rock

Cancel all livestock grazing. Convert sheep grazing privileges to cattle grazing privileges and transfer use to Sub-Unit 2, Massacre Mountain/Nut Mountain.

Sub-Units 2, 3, and 4

The components of the management plans for these sub-units are presented in TABLES 8-15, 8-16, 8-17.

Impacts

Soils

TABLE 8-18 gives the approximate values necessary to calculate the soil and water parameters.

TABLE 8-14

FORAGE CONSUMPTION SUMMARY

Alternative 5

<u>Sub-Unit/Area</u>	<u>Livestock</u>	<u>Wild Horses</u>	<u>Deer*</u>	<u>Antelope*</u>	<u>Bighorn</u>	<u>Total</u>
Sub-Unit 1	0	0	268	1,632	240	2,140
Sub-Unit 2						26,434
Area A	1,445	0	226	109	-	1,780
Area B	1,172	0	124	87	-	1,383
Area C	2,937	0	0	0	-	2,937
Area D	0	0	0	0	-	0
Area E	19,082	0	926	326	-	20,334
Sub-Unit 3						23,841
Area A	11,992	0	329	261	-	12,582
Area B	11,208	0	0	51	-	11,259
Sub-Unit 4						24,649
Area A	3,648	0	1,235	0	-	4,883
Area B	7,652	0	103	131	-	7,886
Area C	9,923	0	906	540	-	11,369
GRAND TOTAL	69,059	0	4,117	3,137	240	76,553

* Represents allocation of livestock AUMs to big game. Due to dietary differences, quality of forage for big game may be the limiting factor and actual utilization may be less than the allocation.

Proposed Management, Massacre Mtn/Nut Mtn.

8-46

TABLE 8-16
Proposed Management, Long Valley/Sand Creek

SUB-UNIT 3

Management Area	A (141,000 acres)	B (159,000 acres)
Grazing Proposal	Season long grazing.	Season long grazing.
Season of Use	April 16 - Sept. 15	May 1 - Sept. 30
Key Vegetation	Bluebunch wheatgrass, Thurber's needlegrass	Basin wildrye, Thurber's needlegrass
Forage Utilization Limit	Moderate	Moderate
Grazing Formula	None	None
Number of Water Facilities to be Developed	12 springs 12 ponds 8 wells	12 springs 12 ponds 12 wells
Miles of Fence to be Added or Removed	+10 (meadow/stream)	+5 (meadows)
Land Treatments	10,000 ac. P/S 10,000 ac. spray 5,000 ac. burn	11,000 ac. P/S 10,000 ac. spray 6,000 ac. burn
Livestock Use Changes	+106%	+41%
Implementation Schedule	1980 - Develop waters 1981/82 - Fence 1981/82 - Seedings 1985 - Graze seedings	1980 - Develop waters 1981/82 - Fence 1981/82 - seedings 1985 - Graze seedings

TABLE 8-18

VALUES USED FOR SOIL AND WATER PARAMETERS CALCULATION
DURING
THREE YEAR PERIOD OF SEEDLING ESTABLISHMENT

Operation	Year One		Year Two		Year Three	
	Soil	Water	Soil	Water	Soil	Water
Plow and Seed	Double erosion	Decrease runoff 50%	Increase erosion 50%	"Normal" water runoff	Erosion slightly less or near nor- mal (no grazing)	Runoff reduction 10%
Spray or Burn	Erosion increase 50%	Increase runoff 50%	Increase erosion 25%	"Normal" water runoff	Erosion slightly less or near nor- mal (no grazing)	Runoff reduction 10%

To allow for adequate seedling establishment and soil utilization, it is necessary to withhold grazing for at least two years following plowing and seeding operations (see TABLE 8-18). Erosion rates are highest in the first year; by the third year vegetation will have established and advanced to the point that erosion will be reduced to 0.5 to 0.7 tons/acre. TABLE 8-18 tells much the same story for spray and/or burn operations. Spraying and/or burning are carried out to "release" grasses; therefore, no seeding is necessary.

Soil erosion during the first and second years following spray or burn operations is generally 50 percent less than that for plowing. This is largely due to the fact that soil is not loosened. While this may increase erosion rates, these rates are minimized by the undisturbed soil surface (TABLE 8-19).

In terms of overall soil loss, TABLE 8-19 demonstrates how hazardous this vegetative manipulation can be. The treated acreage by management area ranges from 2.3 to 13.0 percent. By utilizing the values from TABLE 8-19 it is possible to calculate a mean soil loss value for three years for all treated acres in each management area. These values on an annual tons per acre loss basis are shown beside the normal erosion loss.

This total value of 80,700 tons for all management areas represent 0.1 ton per acre for the entire three year period. This represents an erosion cost of less than 0.03 tons per acre per year during the establishment period.

Since the seedings will be done in relatively small discontinuous blocks, these slight increases in erosion will be further minimized.

Water

Water infiltration will increase and water runoff will decrease during the first year in plowed and seeded areas. In the second year water runoff will be similar to nontreated areas, and by the end of the third year, a 10 percent reduction in runoff is expected.

Since soil is not loosened in spray or burn operations runoff is increased by 50 percent during the first year. By the end of the third year, however, runoff should be 10 percent below untreated areas. Runoff is not expected to be of such volume as to do damage because of the scattered nature of the operations.

As previously noted, the herbicide 2,4-D will be the agent for all sprayings. No significant adverse water quality impacts are expected from this herbicide since its residues in soil and water will be short-lived. Investigations have shown that 2,4-D breaks down in soil relatively rapidly (Sheets and Danielson, 1960), the half-life not exceeding several weeks.

TABLE 8-19
SOIL EROSION LOSSES CAUSED BY VEGETATIVE ESTABLISHMENT IN MANAGEMENT AREAS

Management Area by Number	Vegetative Modification Parameter	Acres Treated	Treated Acres % of Management Area	Average Soil Loss T/Ac Treated Area Over 3 Year Period	"Normal" T/Ac Chapter 3	Erosion Differ- ences Average Annual	Total Increased Soil Loss 3 Years Tons	Area of Manage- ment Unit Acres	Three Year Soil Loss of Manage- ment Area T/Ac
2C	P/S* Burn Spray	1,000 ----- 3,000	2.3 --- 6.9	1.6 --- 1.4	1.4 --- 1.4	+ .2 --- .0	600 ----- 000	43,000	.01
2E	P/S Burn Spray	25,000 10,500 11,500	13.0 5.4 6.0	1.8 1.5 1.5	1.4 1.4 1.4	+ .4 + .1 + .1	30,000 3,150 3,450	192,000	.19
3A	P/S Burn Spray	10,000 5,000 10,000	7.1 3.5 7.1	1.7 1.4 1.4	1.3 1.3 1.3	+ .4 + .1 + .1	12,000 1,500 3,000	141,000	.11
3B	P/S Burn Spray	11,000 6,000 10,000	6.9 6.3 3.8	1.4 1.1 1.1	1.0 1.0 1.0	+ .4 + .1 + .1	13,200 1,800 3,000	159,000	.11
4A	P/S Burn Spray	----- 3,000 3,000	--- 6.0 6.0	--- 1.3 1.3	--- 1.2 1.2	--- + .1 + .1	--- 900 900	50,000	.03
4B	P/S Burn Spray	2,000 ----- 6,000	2.1 --- 6.3	1.8 --- 1.4	1.3 --- 1.3	+ .5 --- + .1	3,000 ----- 1,800	95,000	.05
4C	P/S Burn Spray	----- ----- 8,000	--- --- 6.0	--- --- 1.4	--- --- 1.3	--- --- + .1	--- --- 2,400	132,000	.02

* Plow and Seed

Vegetation

Condition and Trend: Range condition will improve slightly within 20 years. Acres in poor condition will decrease from 403,000 to 281,500, acres in fair condition will decrease from 437,000 to 196,000 acres in good condition will increase from 6,000 to 369,000 and acres in excellent condition will increase from 0 to 500 acres (TABLE 8-20). Management areas in which grazing would be eliminated or regulated by grazing systems would show improvement because growing season rest is provided. Areas which are not managed under grazing systems will remain unchanged.

Plowing and seeding 49,000 acres would significantly decrease the diversity of vegetational structure and species composition. (Specific impacts are as described in Chapter 3.) Spraying of 51,500 acres would initially decrease the forbs and woody plants while increasing the grasses. (Specific impacts are as described in Alternative 4). Burning 21,500 acres would affect the vegetation in a manner similar to that of spraying except that the forbs would initially increase after the burn (specific impacts are as described in Alternative 4). It is assumed that follow up treatment will be applied if necessary to maintain the condition and production of land treatment projects.

The most significant changes would occur in Sub-Unit 1, Areas 2D and E and in fenced sensitive habitat sites throughout the study area. Periodic rest or deferment during the growing season on these areas will improve range conditions. The turnout dates onto federal range would be up to four weeks later than present dates. This allows a small margin of extra time during the critical growing season for the storage of food reserves (Hyder & Bement, 1972). The moderate use restrictions limit forage consumption but will not lead to improved range conditions on areas grazed season long.

Vegetative species that would show response in each ecological site would be as described in Chapter 3. Site characteristics which would affect the rate and degree of response would be unchanged.

The anticipated condition of ecological sites within the various management areas in 20 years is shown on TABLE 8-21.

Vegetative disturbance during the construction of water development and fencing projects would be as described in Chapter 3. Thirty-one acres would be disturbed during spring construction, 162 acres during reservoir construction, and 178 acres during fence construction or removal.

Vegetative Production: Livestock forage production will initially increase from the present 60,800 AUMs to 89,650 AUMs (TABLE 8-22) as a result of later turnout dates, plowing and seeding, burning and spraying. On allotments where turnout dates are set back until May 1, approximately 17 percent additional livestock forage will be produced (Hormay, 1970). Plowing and seeding 49,000 acres will increase forage production by approximately 12,250 AUMs. This production (4 ac/AUM) is occurring on

TABLE 8-20

Range Condition in 20 Years With Alternative 5

	Poor (Acres)	Fair (Acres)	Good (Acres)	Excellent (Acres)	Miscellaneous
Sub-Unit 1	1,703	14,606	60,677	480	11,454
Sub-Unit 2					
Area A	7,125	8,600	1,200	0	475
Area B	2,271	13,193	6,753	0	100
Area C	4,378	9,803	18,562	0	2,130
Area D	3,314	2,038	915	0	1,793
Area E	12,136	55,515	112,259	0	5,600
TOTAL	29,224	89,204	139,689	0	10,098
Sub-Unit 3					
Area A	59,194	23,440	25,000	0	33,530
Area B	108,583	3,730	27,000	0	19,687
TOTAL	167,777	27,170	52,000	0	53,217
Sub-Unit 4					
Area A	39,440	3,256	6,000	0	3,030
Area B	30,428	35,799	16,706	0	9,870
Area C	12,921	25,726	94,009	0	3,238
TOTAL	82,789	64,781	116,715	0	16,138
STUDY AREA TOTAL	281,493	195,761	369,081	480	91,007

TABLE 8-21

VEGETATIVE CONDITION IN 20 YEARS WITH ALTERNATIVE 5

Ecological Site	Present Condition	Grazing Enclosures Sub-Unit 1	Areas 2A, 2B, 3A, 3B, 4A and 4B*4C	Area 2C, 2E, and 4C and the AMP Portion of 4B
1. Shadscale/Indian Ricegrass	Poor	Poor	Poor	Poor
2. Greasewood/Basin Wildrye	Poor	Poor	Poor	50% Poor, 50% Fair
3. Greasewood/Basin Wildrye	Poor	Poor	Poor	50% Poor, 50% Fair
4. Low Sage/Sandberg Bluegrass	Fair	Good	Fair	15% Fair, 85% Good
5. Low Sage/Bluebunch Wheatgrass	Fair	Good	Fair	15% Fair, 85% Good
6. Low Sage/Idaho Fescue	Fair	Good	Fair	Good
7. Juniper-Low Sage/Idaho Fescue	Poor	Fair	Poor	50% Poor, 50% Fair
8. Big Sage/Bluebunch Wheatgrass-Indian Ricegrass	Fair	Fair	Fair	Fair
9. Big Sage/Bluebunch Wheatgrass	Poor	Fair	Poor	50% Poor, 50% Fair
10. Big Sage/Idaho Fescue	Fair	Good	Fair	N/A
11. Big Sage/Basin Wildrye	Poor	Poor	Poor	50% Poor, 50% Fair
12. Juniper-Big Sage/Bluebunch Wheatgrass	Fair	Good	Fair	50% Fair, 50% Good
13. Bitterbrush/Idaho Fescue	Poor	Good	Poor	Good
14. Mountain Mahogany/Western Needlegrass	Fair	Good	Fair	N/A
15. Silver Sage/Mat Muhly	Poor	Fair	Poor	25% Poor, 75% Fair
16. Baltic Rush	Fair	Good	Fair	50% Fair, 50% Good
17. Aspen/Slender Wheatgrass	Poor	Good	Poor	N/A
18. Tufted Hairgrass-Bluegrass	Poor	Excellent	Poor	50% Fair, 50% Good
19. Willow/Tufted Hairgrass-Bluegrass	Poor	Excellent	Poor	50% Fair, 50% Good

* Includes that portion of Area 4B that is not covered by an existing AMP.

TABLE 8-22
Livestock Forage Production (Alternative 5)

Area	<u>Initial AUMs</u>	<u>AUMs-20 years</u>
Sub-Unit 1	6,434	15,232
Sub-Unit 2		
Area A	1,465	1,700
Area B	956	2,020
Area C	2,467	5,325
Area D	400	1,130
Area E	25,242	39,520
Sub-Unit 3		
Area A	10,300	10,351
Area B	12,374	12,074
Sub-Unit 4		
Area A	4,750	4,950
Area B	7,101	11,567
Area C	13,400	19,276
STUDY AREA TOTAL	84,889	123,145

seedlings developed on similar sites with adjacent allotments. Burning 21,500 acres will result in production increase of approximately 12 ac/AUM to 7 ac/AUM) or 4,300 AUMs. Spraying 51,500 acres will result in similar production increases (12 ac/AUM to 7 Ac/AUM). Sprayed areas will provide approximately 10,300 AUMs of forage. These production estimates were extrapolated for existing spraying projects and burns on nearby sites.

As range conditions improve on allotments with grazing management systems, forage production will increase. Anderson's (1978) stocking rate guides were used to calculate the amount of increased forage that could be expected with higher condition classes. In 20 years, production increases through implementation of grazing systems and land treatment projects will amount to approximately 123,145 AUMs (TABLE 8-22).

Threatened and Endangered Plants: Impacts from this alternative would be similar to those described for the proposed action.

Assuming site specific inventories and clearances are conducted on land treatment areas, there will be no adverse impacts on threatened or endangered plants from these treatments. Improvement in range conditions would benefit any plants that may occur.

Livestock Grazing

Implementation of extensive seeding, spraying, and burning projects will allow increases in livestock use on most areas. In 20 years, livestock use will increase to approximately 82,461 AUMs. Turnout dates are two to four weeks later which will require operators to provide additional forage during the spring (see economics). Cancellation of sheep use will require a complete change in the Bunyard operation.

Wildlife

Deer would achieve a slight increase from 1,800 to 2,000 animals. Antelope would show a higher population increase, from 1,200 to 2,170. Sage grouse and quail numbers are expected to increase slightly to moderately. No change in waterfowl populations is expected. Nongame habitat, diversity, and density will experience a variable, slight decline, primarily as a result of the large scale vegetative manipulation. Raptors will not be significantly affected while fisheries will continue to decline. Water development will improve water distribution for wildlife. Fences will create a minor impediment to big game movements. However, fencing sensitive habitats (streams, meadows, riparian and aspen) will provide substantial benefits to most species.

The primary impact of all types of land treatments will be an alteration of wildlife species composition and a decrease in abundance as a result of changes in habitat structure and food supply, as described for Alternative 4.

Wild Horses and Burros

Wild horses and burros would be eliminated from all areas.

Cultural Resources

Qualitatively, this alternative poses no impacts on cultural resources not discussed in the analysis of the proposed action (Chapter 3), but in several of the management areas the intensity of impacts would be substantially greater. Impacts in the High Rock Sub-Unit and in Management Area D of the Massacre/Nut Mountain Sub-Unit would be as described in Chapter 3, save that a 25 percent increase in wild horse numbers would very slightly diminish the benefits anticipated from the elimination of livestock grazing.

Recreation

Removal of livestock from High Rock Canyon region will be the primary benefit to recreation. Other actions proposed will not significantly impact recreational use.

Visual Resources: Extensive range treatments (seedings, burning, spraying) and large scale water developments will create numerous visual contrasts. Despite mitigation, impacts of these actions will still create large scale residual unavoidable adverse impacts on the aesthetic qualities of the areas treated.

Wilderness: Cancellation of grazing in Sub-Unit 1 would create the same high positive impact on wilderness resources as for the proposed action.

Except for Management Area 2D where grazing would be eliminated and Management Area 4C where grazing would remain the same, increased grazing within the other sub-units would adversely affect wilderness resources by continuing to trample vegetation and archaeological sites, decrease water quality, cause further soil erosion and compete with wildlife for forage. Additional developments would, despite adherence to interim management policy, affect scenic qualities within the WSA's. Elimination of all wild horses and burros would remove horse and burro viewing opportunities.

Socio-Economics

This alternative proposes extensive on-the-ground developments in order to combine range improvement with a minimum disruption of the dependent livestock operators. However, adjustments in seasons of use resulting from the proposed grazing systems would alter the patterns of use that have evolved over the years (FIGURE 8-2). In most cases, present heavy use early in the season would be replaced by uniform cattle numbers over the entire grazing season. TABLE 8-23 presents allowed livestock use under Alternative 5.

TABLE 8-23

Present and Proposed Use
By Operator
Alternative 5

	Present Use (AUMs)	Use Under Alternative 5 (AUMs)
Berryessa	2,178	4,487
Bordwell	1,040	1,300
Bunyard	3,248	3,725
L & L Cattlr Co.	3,133	2,723
Carey, F & J	121	151
Carey, P & J	154	193
Cockrell's	177	221
Coops	1,702	1,598
Earp	8,283	8,518
Hill	722	0/722 ^{1/}
Fee	3,371	4,347
Hapgood	496	699
Harris	895	1,119
Heryford	1,100	1,397
Hill, Norene	2,004	2,826
Hussa	1,838	1,838
Jones	392	636
Kirkpatrick	2,433	3,578
Kyte	1,111	1,111
Laxague	1,104	2,112
Marx	1,588	2,006
Page	352	586
Parman, J.	1,364	1,320/2,043
Parman, R.	128	264
Peterson	369	562
Quirk	560	790
Schadler, J.	57	98
Schadler Ranch	6,315	7,893
Smith	166	234
Steward	560	1,045
Warren's Ranch	1,548	2,739
Weber	7,076	7,057
Wolfsen's	1,145	1,145
<hr/>		
TOTAL	56,730	69,515

^{1/} First number is the proposed use for Hill and for Joe Parman during the year of non-use in management area 2A (1 year out of 3).

Resulting from this alternative is the need for those ranchers in Sub-Units 1, 2, and 4 to develop sources of early season feed. The initial response would probably entail either purchasing additional good quality hay or sacrificing some production on base ranch flood meadows by pasturing these fields during their normal irrigating and growing period.

A total of six of the permittees would have substantial cost increases under this alternative. Of these six, one would possibly be forced out of business by cancellation of his permit.

Closing Sub-Unit 1 to livestock grazing would impact the two present permittees. The privileges of the two permittees would be transferred to Sub-Unit 2, Management Area 2E, where both already hold grazing permits. Additional forage would be developed through seedings. One of these permittees, Bunyard, would lose his sheep permit. Since this permit is a key ingredient to his present sheep operation, Bunyard would have to convert to cattle. The cost of the conversion would be very substantial, possibly causing Bunyard to sell his ranch.

Two economic benefits would accrue from this alternative. First, with but two exceptions, permitted numbers of cattle on the range would be similar or higher than at present after June 15, although this benefit is, for the most part, offset by the early season loss. The permittees all have well-developed sources of summer and fall feed from either private or other federal lands. The increase in BLM grazing would be useful primarily for running yearlings or stockers. The early season loss in grazing would discourage increasing herd sizes as a response to the increased summer forage.

The second economic benefit would affect the ranchers in Sub-Unit 3. In this area, no changes are made in seasons of use and substantial increases are made in permitted numbers (an average of 69 percent, from 13,768 to 23,200 AUMs).

The long-term economic impact of this alternative would be beneficial to the permittees as a group and to the local economy (although many of the individual ranchers will be adversely affected due to the early season feed cost increases). If additional feed sources can be developed to complement the increased grazing permitted on the public lands under this alternative, approximately 2,660 additional animals could be added to the combined livestock inventory of the permittees, an estimated increase of about 10 percent. This increase would add about \$379,000 ((2,600 AUs) X (\$11.88/AUM) X (12 AUMs/AU)) to the permittees' gross annual sales. Approximately 69 percent of this amount, or about \$262,000, would be received by the permittees based in Modoc County.

If these herd increases occur, this alternative would have a slight beneficial impact on the planning unit's economy. Using the assumptions presented in Chapter 3, a 10 percent increase in gross beef sales would increase retail sales within the Surprise Valley by about 4 percent, assuming that the proportion of in-valley purchases remains unchanged.

In summary, Alternative 5 would create substantial disruptions in the present utilization pattern of public lands in the spring. Cost increases would be large for some ranchers. However, if the ranchers are able to adapt to the alternative, it has a potential of increasing some of the operators' permitted use, and might provide a very small stimulus to the local economy through increased retail purchases.

It is doubtful that any significant social changes would occur in the planning unit as a result of Alternative 5.

Impacts -- Sub-Unit 1, High Rock

Vegetation

The impacts of this alternative would be similar to those discussed for the proposed action. However, vegetative response would be slowed due to the benefits which would accrue from the continued presence of wild horses.

Livestock Grazing

All livestock production will cease. Cancellation of sheep use and converting it to cattle will require major adjustments in the Bunyard operation.

Wilderness

Impacts would be as described for the proposed action.

Wildlife

Impacts would be identical to those described for the proposed action.

Socio-Economic Conditions

Bunyard: Radical changes in Bunyard's present operation will occur with the proposed conversion in class of livestock from sheep to cattle. Bunyard would be licensed for 745 head in Areas 2E, 4A, and 4B. His Massacre Ranch lands presently produce 100-150 tons of hay. Additional cropland would probably have to be procured to produce approximately 1,075 tons of hay to winter the number of cattle Bunyard could license on the public lands under this alternative. Assuming that 180 acres of sprinkler-irrigated alfalfa is sufficient for this production, the conversion from sheep to cattle would require an investment of about \$410,000 for purchase and development of land and for 500 additional cows.

In addition to the costs involved in converting to a cattle ranch, Bunyard's 1,505 AUM winter sheep grazing permit on the Winnemucca District and his permit for grazing 1,000 sheep for three weeks during the summer on the Modoc National Forest would be affected. The Winnemucca District's range conservationist maintained that Bunyard's range is better suited

for sheep use (Hines, 1978). Hence, this permit would have to be sold or exchanged for cattle use elsewhere in the Winnemucca District. The Forest Service was uncertain of its reaction to a request in change of class.

Earp: Alternative 5 would transfer Earp's privileges to Sub-Unit 2, Area 2E, and delay present turnout date by a month (from April 1 to May 1). Later turnout would require the purchase of about 393 tons of good quality hay for either direct feeding or for replacement feed for the loss in meadowland production from using these lands for early pasture. Approximately \$26,500 would be added to Earp's annual operating expenses due to this additional hay expense.

During the grazing season, Earp would be able to increase the number of cattle he could run on the public lands by about 400 head. Increasing his herd by this number would increase his gross annual revenues by about \$70,000 (using average prices for the last five years). Operating and capital costs would also increase with this herd-size increase, but the general economic impact of Alternative 5 would be beneficial to Earp's operation.

Additional costs would face Earp by the transfer of his privileges to Management Area 2E. Running in a four pasture system with five other operators would entail an extra week or two of labor during the fall gathering.

Impacts -- Sub-Unit 2, Massacre Mountain/Nut Mountain

Vegetation

Management Area 2A: This area will show only slight improvement in range condition over the next 20 years. The greatest improvement will be on the sensitive habitats which are fenced. Grazing will cause further headcutting of meadows and eventual permanent loss and degradation of meadows. A two week later turnout date will increase vegetative production by about 15 percent (Hormay, 1970). Rest every third year is not sufficient for vigor recovery of grasses and it does not provide seed trample or adequate rest for seedling establishment (Hormay, 1970). Only those areas that are distant from livestock concentrations and receive light use will improve. Bitterbrush will not receive adequate rest for maximum production. Bitterbrush seed production and seedling establishment will be limited by use two years out of three.

Management Area 2B: This area will not show appreciable improvement. Continuous grazing during the growing season each year will prevent range improvement. Plants are not provided an opportunity to restore vigor after grazing or to produce seed. Removing livestock on July 31 will lessen livestock concentrations on meadows and on bitterbrush ranges that are normally heavily used during the summer and fall months. The condition of meadows, however, would remain in poor condition because of heavy use during the growing season. Bitterbrush would still be utilized by livestock during July and only slight improvement in condition is anticipated. A two week later turnout will increase vegetative production by approximately 15 percent (Hormay, 1970).

Management Area 2C: Continuation of the present AMP will be favorable. However, insufficient rest is provided for complete recovery of plants that are heavily utilized. Areas which are close to water or which receive greater than 70 percent utilization will not improve. The condition on approximately 80 percent of the area of the wetter, more productive ecological sites would be anticipated to improve (TABLE 8-21).

The impacts of plowing and seeding 1,000 acres would be as described in Chapter 3. Spraying 3,000 acres would have similar impacts as described for spraying in Alternative 4. Livestock forage production will increase by approximately 250 AUMs on the seeded areas and 600 AUMs on the spray area. The production of the treated area is expected to decrease significantly as a result of sagebrush invasion.

Management Area 2D: The impacts in this area would be the same as discussed for the proposed action.

Management Area 2E: Vegetative response will be variable. Insufficient rest is provided for complete recovery of plants that are heavily utilized. Areas that are close to water or which receive greater than 50 percent utilization will not improve. The slightly later turnouts and the rotation of deferment would have beneficial effects on the grasses. Fenced meadows would improve to excellent condition but unfenced meadows and concentration areas would show little improvement. Bitterbrush improvement is expected since it would not be grazed during the first two grazing treatments of the grazing formula. Two years of rest will be sufficient for recovery of vigor and seedling establishment.

The condition on approximately 80 percent of the area of the wetter, more productive sites is anticipated to improve (TABLE 8-21).

The impacts of seedings, spraying, and burning would be the same as previously discussed in Chapter 3 and Alternative 4. Livestock forage production will increase by approximately 10,600 AUMs on these areas.

Livestock Grazing

Management Area 2A: Impacts will be minimal. Livestock handling and movement costs will increase if a grazing system is developed in conjunction with the Sheldon. Since minimal vegetative improvement is anticipated, livestock production and performance will remain unchanged. Impacts from additional water developments will be as described for Alternative 1.

Management Area 2B: Establishment of a May 1 to July 31 grazing season will significantly affect livestock management. Since livestock AUMs remain unchanged, greater numbers of livestock would graze the allotments. Total pounds of livestock produced for sale would increase due to the high protein content of range grasses prior to July 31.

Management Area 2C: Impacts of this alternative would be the same as that discussed for Alternative 1 except that spraying and seeding projects would increase forage availability and livestock use.

Management Area 2D: Impacts would be the same as described for the proposed action in Chapter 3.

Management Area 2E: Impacts would be similar to those described for the proposed action in Chapter 3 as would the livestock herding, sorting, and handling costs. Differences would occur in the number of livestock moves during the year. This alternative would require three moves whereas the proposal would only require one. Livestock performance would be slightly lessened and death losses would slightly increase. Implementation of seedings, spraying, and burning projects would increase the availability of livestock forage and initial livestock use would be 30 percent above present levels.

Wildlife

Management Area 2A:

Deer: Limiting grazing to moderate use and keying utilization to bitterbrush would ensure a 15 percent increase in deer forage availability. Resting the area every third year would provide for only partial recovery of bitterbrush which would yield slightly increased vigor and slightly improved condition. An increase in deer numbers from 100 to 110 is expected.

Antelope: Impacts on antelope would be similar. Increased bitterbrush forage during summer and rest years will remove one of two major sources of competition between antelope and cattle. Spring competition for forbs will still occur two out of three years. Antelope may show a 50 percent population from 50 to 75.

Sage Grouse: The primary effect on sagegrouse will be the preservation of 50 percent of late summer and fall habitat by fencing one-half of the meadows. Productivity would be slightly higher every third year due primarily to the elimination of nest disturbance and spring competition for forbs.

Nongame Species: Species composition and relative abundance of nongame birds and small mammals will be altered in the treatment areas. Horned larks and lark sparrows will increase in abundance and become the primary species in the seedings. Meadowlarks, sage sparrows, song sparrows, Brewer's sparrows, Brewer's blackbirds, and loggerhead shrikes will all decrease in abundance. Savage (1977) and BLM surveys indicate bird densities and species richness decrease significantly in the seeded areas.

The change in habitat structure brought about by plowing, seeding, and spraying will have similar impacts on small mammals. Abundance of several small mammals will be reduced in the treated areas. The resultant small rodent population will be composed primarily of deer mice, kangaroo rats, and chipmunks.

This alteration of prey may well affect the raptor population. The degree of impact on raptors is unknown and may be partially offset by prey being more available to raptors though less abundant.

Management Area 2B: A two week delay in turnout and moderate use limitation would slightly benefit 60 deer and antelope. Populations of both species would be expected to increase to 65. Other impacts would be as described for Alternative 1.

Management Area 2C:

Deer: No significant impacts.

Antelope: Additional antelope may initially be attracted to the plowed and seeded areas (1,000 acres), due to the initial increase in forbs. However, grasses would eventually outcompete the forbs making this attraction temporary. Antelope populations would increase slightly.

Sage Grouse: Sage grouse will be negatively impacted. Plowing, seeding and spraying will eliminate the only known strutting ground in the management area. If others exist, the increased stocking rate would lead to additional nest disturbance and to increased degradation of meadows which provide forbs during late summer and fall.

Nongame Species: Species composition and relative abundance of nongame birds and small mammals will be altered in the treatment areas. Horned larks and lark sparrows will increase in abundance and become the primary species in the seedings. Meadowlarks, sage sparrows, song sparrows, Brewer's sparrows, Brewer's blackbirds, and loggerhead shrikes will all decrease in abundance. Overall bird densities will decrease by 30 percent and species diversity by 40 percent in the seeded areas.

The change in habitat structure brought about by plowing, seeding and spraying will have similar impacts on small mammals. Abundance of most small mammals will be reduced 30 to 50 percent in the treated areas. The resultant small rodent will be composed of approximately 65 percent deer mice, 20 percent kangaroo rats and 10 percent chipmunks. Rabbit densities will also be lower within the treated areas but may be concentrated in the periphery.

This alteration of prey base will affect the raptor population. The degree of impact on raptors is not known and may be partially offset by prey being more available to raptors even though less abundant.

Habitat Types: Spraying, plowing and seeding would eliminate 4,000 acres of primarily big sage habitat which is abundant but crucial to sage grouse. Meadows and aspen stands would be damaged further and possibly lost due to increased stocking rates and lack of protective fencing.

Projects: Water developments will have slight positive and slight negative impacts on wildlife (see Area 2A). Fifteen miles of temporary fence surrounding the seedings will present a hazard to large mammals for as long as it remains.

Land Treatments: The primary impact of land treatments will be an alteration of wildlife species composition and a decrease in abundance as a result of changes in habitat structure and food supply, as described for Alternative 4.

Management Area 2D: Impacts would be identical to those listed under the proposed action.

Management Area 2E:

Deer: A four pasture deferred rotation grazing system would have some beneficial impacts on deer. Overall forage competition would be reduced by 15-25 percent. Annual bitterbrush production would increase in availability to deer in 50 percent of the area. Vegetational diversity would also increase. The net result would be improved health and productivity of the deer population. However, slightly more than 20 percent of the management area would be treated by plowing and seeding, spraying, or burning. The Vale BLM District found that deer use of seedings was nearly nonexistent except when heavy snows forced use and that spraying reduced deer use on summer range. The deer population would increase from 375 to approximately 450 due to the improved condition of bitterbrush and the wetter habitat types. However, burning on bitterbrush sites would reduce this potential increase.

Antelope: Summer competition with livestock for forbs and bitterbrush will be reduced on one-half of the area. Increased forbs and decreased brush following spraying and burning will benefit antelope during the summer. Seedings will provide short term benefits to antelope until grasses outcompete forbs, at which point the impacts become negative. Antelope should increase from 150 to 225 animals. The construction of 25 miles of fence would present a minor but significant hazard to antelope but would also provide increased succulent forage by eliminating livestock grazing on 450 acres of meadows.

Sage Grouse: Nest disturbance prior to hatching would be reduced by 75 percent by grazing only one of four pastures during the nesting season. Fencing 450 acres of meadows would provide increased summer forage. Wallestad (1974) found a 63 percent decrease in strutting males following only a 31 percent loss of adjacent habitat in Montana. There would be a severe reduction in potential productivity due to habitat loss through

land treatments. However, only moderate decrease in realized productivity is expected due to the increased productivity of remaining sage grouse resulting from reduced removal of nesting cover and the increase in summer forb availability.

Quail: Fencing meadow areas would increase available cover. Increased escape and roosting cover will maintain quail populations at existing to moderately higher levels.

Nongame Species: Moderate use and partial rest each season will provide increased food and cover for nongame species, resulting in the same changes described for Management Area 2C. Fencing meadows will increase species density and diversity on 450 acres. Land treatments would reduce wildlife abundance and alter species composition on 42,000 acres in the same manner as Management Area 2C.

Wilderness

Although some benefits from removing livestock from Management Area 2D would occur, particularly from lessening impacts on archaeological resources, construction of an enclosure fence would add another visual intrusion to the Massacre Rim WSA. On the two WSA's and one recommended WSA within Sub-Unit 2, increased livestock grazing would impact vegetation, water quality, soils, wildlife, archaeological sites and scenic quality. Additional developments would add visual intrusions to the three roadless units.

Socio-Economic Conditions

Alternative 5 would significantly change the current operations of three of the nine ranchers in Sub-Unit 2. Turnout dates would be delayed two weeks for four of the ranchers. Overlap in seasons of use with the Sheldon Range would alter the operations of three of the permittees. Six of the ranchers would be faced with a two week earlier take-off date. Additionally, three of the six ranchers in Management Area 2E would accrue greater labor costs for up to two weeks during the fall gathering due to running in common with other operators.

Additional costs facing the ranchers with delayed turnout dates might result from increased medical expenses and other costs associated with increased calf diseases and mortality. These costs would vary depending on the rancher's management of his calves before the permitted turnout and, hence, cannot be quantified.

With adjustment to the later turn-out dates, at least three of the ranchers in this sub-unit would realize immediate benefits from Alternative 5. Marx, Weber, Earp, and Joe Parman (for two of three years) would be permitted to run more head than they now may run. About 700 cows could be added to these operators' permits.

Impacts -- Sub-Unit 3, Long Valley/Sand Creek

Vegetation

Management Area 3A: The impacts would be similar to those discussed in Alternative 1. Exceptions would be in the sensitive habitat exclosures which would improve dramatically over the next 20 years and in those acreages receiving vegetative treatments of plowing and seeding, spraying, or burning. Livestock forage production would increase by approximately 5,500 AUMs on land treatment areas.

Management Area 3B: The impacts would be the same as those covered for Management Area 3A. Livestock forage production would increase by approximately 6,000 AUMs on land treatment areas.

Livestock Grazing

Management Area 3A: Impacts would be similar to Alternative 4. Differences would occur in the acreage of vegetative treatments. Initial livestock use would be increased by 106 percent.

Management Area 3B: Impacts would be similar to Alternative 4. Slightly later turnout dates would require livestock operators to provide additional spring forage. Increased acreages of plowing, seeding, and burning would allow initial livestock use to be increased by 41 percent.

Wildlife

Management Area 3A:

Deer: Land treatments would negatively impact deer on 25,000 acres (30-40 percent of the deer range in Management Area 3A). Failure to key utilization to bitterbrush could result in continued competition and overuse of browse species. Burning 5,000 acres of primarily bitterbrush/Idaho fescue would further reduce deer browse. Stream and meadow fencing would provide increased succulent spring and summer forage in these areas. The total deer population in this area is expected to decline from 175 to about 155-160 animals.

Antelope: Antelope use would decrease on plowed and seeded areas within a few years after seeding. Spraying and burning would initially remove antelope browse but will increase forb availability. Thirty-five miles of fence construction would hinder antelope movement and cause some mortality. However, ten miles of this fence would also protect meadows and ensure availability of forbs during the summer. Antelope would be expected to increase from 150 to 180 animals.

Sage Grouse: Fencing 150 acres (50 percent) of meadows would benefit sage grouse by ensuring the availability of summer forbs. Potential sage grouse production will be reduced by land treatment practices on 20 percent of the area. However, the only known strutting ground would not be affected. Sage grouse would be expected to increase slightly.

Quail: Additional cover provided by fencing Sand Creek and meadows would increase nesting success and reproductive potential. The moderate use limitation would provide 10-20 percent more cover and a slight increase in forage. However, habitat improvement must be coupled with favorable weather conditions for this increased potential to be realized.

Nongame Species: Nongame birds and small mammals would be affected primarily in the land treatment areas. Horned larks would increase in numbers and become the dominant species while abundance of sage sparrows, vesper sparrows, and sage thrashers would decrease. Overall bird use would decline by 30 percent.

Small mammal population densities and species richness would be expected to decrease moderately in the seeded areas.

Fencing 50 percent of the meadows and Sand Creek would have the opposite effect but only involving 150 acres. Allowing these most productive habitat types to reach site potential would provide remnant areas of highly productive wildlife habitat.

Impacts on raptors would not be expected to be significant in spite of an altered prey base.

Management Area 3B:

Deer: No significant impacts are expected.

Antelope: No significant impacts.

Sage Grouse: A slight increase in sage grouse production would be expected due to the increased availability of forbs as a result of meadow fencing. This would be expected in spite of a decrease in the potential productivity resulting from a 20 percent reduction in habitat through land treatments. The only known strutting ground in the management area would not be affected by land treatment practices.

Nongame Species: Although 27,000 acres (17 percent) of Management Area B would be treated, impacts would not be as pronounced as in the more productive ecological sites. Kangaroo rats would be expected to decrease, and pocket mice will increase. Deer mice would remain the dominant species, and its relative abundance would remain high. Overall density of small mammals would be expected to decrease slightly in the treatment areas.

Sage sparrow abundance would decrease in the seedings, but would remain the dominant species. Meadowlarks would become more abundant and make up a significant portion of the population.

Wilderness

Although forage would increase due to land treatments outside the WSA's, increased grazing and additional developments would impact the western portion of the Massacre Rim WSA and the far southern part of the Sheldon contiguous WSA in the same manner but to a greater degree as described under Alternative 1.

Socio-Economic Conditions

Alternative 5 would retain current seasons of use and increase the permitted AUMs by 106 percent (from 5,821 to 12,992 AUMs) in Management Area 3A and by 41 percent (from 7,947 to 11,208 AUMs) in Management Area 3B. This is an overall increase of 9,432 AUMs, or 69 percent. If commensurate feed can be obtained to keep the cattle over the winter, approximately 1,886 extra head (9,432 AUMs divided by 5 months) could be added to the permittee's inventory. This would increase livestock sales by about \$269,000, or about 69 percent over present livestock sales from Sub-Unit 3.

Impacts -- Sub-Unit 4, Mosquito

Vegetation

Management Area 4A: The impacts would be very close to those discussed for Alternative 1. The fenced sensitive habitats would show significant improvement. The 6,000 acres of spray or burn should show an initial improvement followed by a steady decline in vegetative condition over the next 20 years as the area is continuously grazed (Hormay, 1970). Initially, the livestock forage production on treatment areas would increase by approximately 1,200 AUMs.

Management Area 4B: Range condition would improve on a portion of the area grazed under the deferred rotation system. Two years of deferment until seedripeness following use during two consecutive growing seasons does not provide adequate rest to restore plant vigor of heavily utilized plants (Hormay, 1970). Only those areas that are used moderately or lightly will improve in condition. Those areas that are adjacent to water or livestock concentration areas will be grazed heavily even with moderate use restrictions and are not anticipated to improve significantly. Tufted hairgrass-bluegrass, willow tufted hairgrass, and the drier ecological sites should remain in their present condition class. Approximately 50 percent of the area of the wetter, more productive sites would improve in condition (TABLE 8-21). The three supplemental pastures, primarily private meadows, are in good condition now and will remain in good condition over the next 20 years. The condition of the horse pasture is expected to remain relatively static over the next 20 years. Impacts of plowing and seeding and spraying will be as discussed in Chapter 3 and Alternative 4. Livestock forage production of land treatment areas would initially increase by approximately 1,700 AUMs.

Management Area 4C: Impacts would be similar to those discussed for Area 2E.

Livestock Grazing

Management Area 4A, 4B, and 4C: Impacts would be similar to those described for Alternative 4. Differences would occur in initial stocking rates which are increased under this alternative because of additional seeding, spraying, and burning projects.

Wildlife

Management Area 4A:

Deer: Keying utilization to bitterbrush would benefit the 600 deer in this area. Available deer browse would increase by 20-40 percent. Burning 3,000 acres could remove a significant but undetermined amount of bitterbrush. Spraying would eliminate another 3,000 acres from potential deer use. About 3,000 acres of yearlong deer range (15 percent of the deer range in Management Area 4A) would be eliminated while quality of the remaining deer range will be improved. The deer population would be expected to remain unchanged at 600 wintering and 100 summering animals.

Antelope: No significant impacts.

Sage Grouse: Fencing meadows would benefit sage grouse by increasing summer forb availability. However, the only known strutting ground in this management area could be eliminated by land treatment practices. The already low sage grouse density could be even further reduced, and nesting could be eliminated.

Nongame Species: Invasion by juniper currently provides for existing species diversity on low sage sites. Loss of juniper to spraying and burning on 6,000 acres would eliminate those species commonly associated with juniper, such as flickers, scrub jays, mountain bluebirds, red-breasted nuthatches, and desert woodrats. Fencing 50 percent of the meadows and aspen groves would increase bird use and small mammal densities in the area. Long-tailed meadow mice would be expected to increase and sagebrush voles would likely invade the meadows as more cover becomes available following fencing.

Riparian: Eight-, Nine-, Ten-, and Eleven-Mile Creeks would be expected to remain as described in Chapter 2.

Management Area 4B:

Deer: Reduction in bitterbrush following spraying and seeding, increased stocking rates, and failure to key utilization to bitterbrush would ensure increased competition between deer and livestock. The deer population in Management Area 4B would be expected to show a decline from 75 to 50 deer.

Antelope: Antelope would benefit temporarily from reduced brush cover and increased forb availability following spraying and seeding. However, as grasses outcompete forbs, antelope use would decline on the 8,000 acres of treated land. The population would be expected to increase from 60 to 75 wintering and from 190 to 250 summering antelope.

Sage Grouse: Increased forb availability resulting from fencing meadows would benefit sage grouse by providing increased summer forbs for brood rearing. Plowing and seeding would eliminate one of five known strutting grounds. The net impact would be a slight decrease in sage grouse populations.

Management Area 4C:

Deer: Bitterbrush utilization would be reduced by about 25 percent. However, this would not insure that total bitterbrush use does not exceed recommended levels. Resting each pasture every other year and delaying turnout until May 1 would allow for adequate recovery of grasses and forbs making them more available to deer during the spring and summer. However, the two pasture system would not allow for adequate recovery of browse in areas easily accessible to livestock. Deer numbers would be expected to increase from 400 to 440.

Antelope: The moderate use limitation on bitterbrush would provide additional summer forage for antelope. Spring and summer competition for forbs would be eliminated on 50 percent of the area each year. Fencing sensitive habitat would increase spring forb availability. Antelope populations in Management Area 4C would be expected to increase from 275 to 360 for the summer population and from 220 to 300 for the winter population.

Sage Grouse: Increased plant vigor, increased vegetative density, increased abundance of grasses and forbs and removal of competition every other year will benefit sage grouse. Forage competition and removal of nesting cover will continue in the use pasture. Fencing crucial meadow complexes will contribute to increased productivity. Sage grouse populations would be expected to show a moderate increase.

Quail: Providing undisturbed habitat through fencing meadow, riparian and aquatic habitat would increase the potential productivity of quail by increasing roosting and escape cover.

Nongame Species: As range condition improves and more layers are added to the vegetative structure, nongame wildlife use would change as described under the proposed action, though vegetative recovery and corresponding nongame wildlife use changes would be slower and less dramatic than under systems providing more rest and seed trample treatments.

Riparian/Aquatic Habitat: The riparian and aquatic habitats of Twelve Mile and Coleman Creeks would improve dramatically as described under the proposed action for Sand Creek (Management Area 3A).

Wilderness

Same as for Alternative 1 with some possible additional visual impacts from further livestock developments.

Socio-Economic Conditions

The forage allocated to livestock in this sub-unit would increase under Alternative 5. However, instituting a five month grazing system would change the present patterns of use for all but two of the 15 operators in this sub-unit. Resulting from this extended season would be a reduction in permitted numbers for seven of the permittees. The economic impacts of Alternative 5 in this sub-unit will be ambiguous, depending upon the ranchers'

ability to find or develop additional sources of feed, if necessary. Operating costs would increase substantially for at least three of the 15 permittees, but the alternative should not force any of these ranchers out of business. Some operators, primarily those in Areas 4A and 4B would have an increase in their permitted AUMs. If commensurate feed sources can be developed, most operators in this sub-unit would be able to increase their herd sizes. Alternative 5 would increase the allowed forage harvest in Sub-Unit 4 by 16 percent, from 18,621 to 21,679 AUMs. The increase of 3,066 AUMs over the five month grazing season would represent an increase in cattle numbers of about 612 head (3,058 AUMs/5 months). Livestock sales from this sub-unit could therefore increase 16 percent, or \$87,300, from present levels.

Mitigation

Mitigation measures described in Chapter 4 will also apply under this alternative.

The two pasture systems would be modified to provide two growing seasons rest during every three years on significant mountain brush sites. This would be accomplished using the prescriptive management specified for mountain brush sites under Sand Creek in TABLE 4-2. This would provide twice as much growing season rest and would significantly reduce the adverse impacts associated with grazing pressure in livestock concentration areas.

Unavoidable Adverse Impacts

As described under Alternative 4, unavoidable adverse livestock-related impacts on the natural resources of the ES area would continue save those areas from which livestock are excluded. Under this more **intensive** and extensive vegetation manipulation and range facility construction program, many of these impacts would be intensified.

Operating changes would be required of permittees in Sub-Units 1, 2, and 4. Proposed changes in seasons-of-use would require these ranchers to develop additional spring feed sources. In some cases additional annual costs could increase by up to \$20,000 as spring feed is developed. Cost increases of this magnitude would affect perhaps 4 of the 35 permittees.

Increased grazing and livestock developments would result in unavoidable adverse impacts in Sub-Units 2, 3 and 4 to wilderness resources.

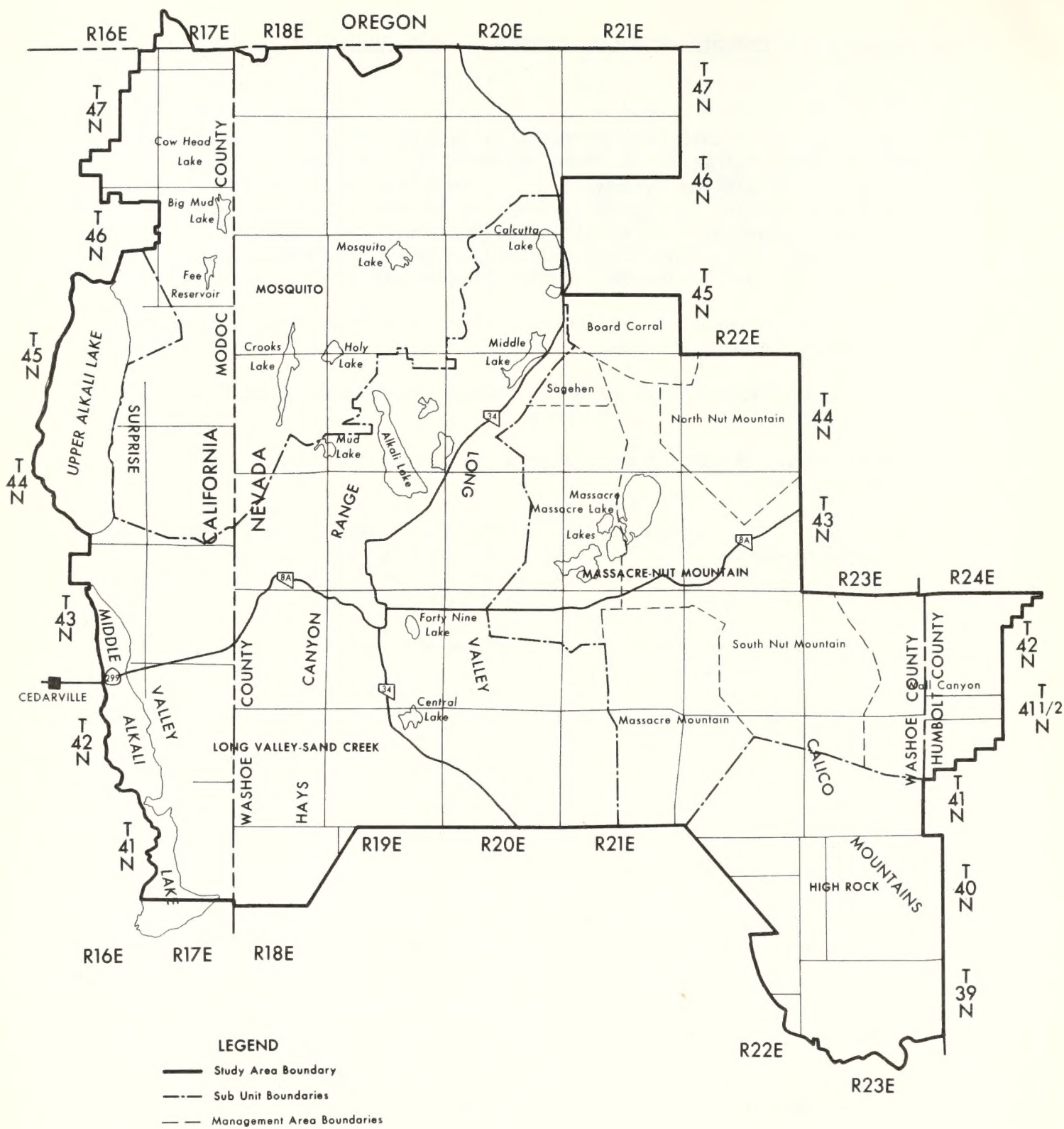
ALTERNATIVE 6 - COORDINATED PLANS WITH U.S. FISH AND WILDLIFE SERVICE

Description

This alternative emphasises a coordinated management approach with the Sheldon Antelope Refuge (U. S. Fish and Wildlife Service). This plan also maximizes use of grazing systems for long term ecological site improvement but minimizes changes in stocking levels by increasing forage production through land treatments. This plan will implement rest-rotation and deferred grazing without significant livestock reductions or economic loss to existing permittees. The basic elements of this alternative are:

1. Little or no change in present allotment boundaries (MAP 8-1), seasons of use, or stocking rates.
2. Vegetation manipulation on 36,700 acres: 25,700 acres to be seeded and 11,000 acres for brush removal.
3. Development of 250 water sources and construction of 100 miles of pasture fence.
4. Removal of wild horses from Sub-Unit 1 and reduction by 25 percent in other sub-units. This level of wild horse use is necessary to meet land use objectives in Sub-Unit 1 and it provides an alternate level of forage allocation to horses in the remaining areas.
5. Implementation of multi-pasture systems with no significant change in present summer use but reductions in early spring use.
6. Wildlife would be managed at reasonable numbers defined in the proposed action.
7. North Nut Mountain (23,000 acres) would have adjusted dates of grazing plus a 3-pasture system with two years of rest out of three. A seeded area is proposed to allow early season grazing.
8. The Wall Canyon Allotment (52,000 acres) would be grazed under a 2 treatment deferred rotation grazing system. This system would be preceeded by a phase-in period in which the allotment would receive a complete year of rest.
9. The viability of this alternative depends on the final decisions contained in the USFWS land management plan for the Sheldon Antelope Range which is yet to be finalized.

The components of the management plan are shown on TABLES 8-24 to 8-27. The forage consumption summary is shown on TABLE 8-28.



MAP 8-1

TABLE 8-25

8-76

TABLE 8-25 (Continued)
SUB-UNIT 2

Management Area	Wall Canyon (52,000 acres)	Massacre Lake (42,000 acres)	Board Corral (17,000 acres)	Sagehen (6,000 acres)
(MAP) Grazing Proposal	Deferred rotation 1 growing season, Rest out of 2	5 pasture rest-rotation	Graze 1 out of every 2 years.	Graze 1 out of every 2 years.
Season of Use	May 1 to October 15	April 1 to Aug. 30	May 16 to Sept. 30	May 16 to Sept. 30
Key Vegetative Species	Bluebunch wheatgrass	Idaho fescue, Crested wheatgrass	Idaho fescue, Bitterbrush	Idaho fescue, Bitterbrush
Forage Utilization Limit (Key Species)	Moderate	Moderate	Moderate	Moderate
Grazing Formula to be Applied	<p>PHASE-IN TREATMENT</p> <p>J F M A M J J A S O N D</p> <p>1 & 3</p> <p>2 years</p> <p>2 years</p> <p>2 years</p> <p>REST</p> <p>2 & 4</p> <p>2 years</p> <p>2 years</p> <p>2 years</p> <p>REST</p> <p>5</p> <p>2 years</p> <p>2 years</p> <p>2 years</p>	<p>Pasture</p> <p>J F M A M J J A S O N D</p> <p>1 & 3</p> <p>2 years</p> <p>2 years</p> <p>2 years</p> <p>REST</p> <p>2 & 4</p> <p>2 years</p> <p>2 years</p> <p>2 years</p> <p>REST</p> <p>5</p> <p>2 years</p> <p>2 years</p> <p>2 years</p>	<p>Graze 1 out of every 2 years from May 16 to September 30.</p> <p>Graze 1 out of every 2 years from May 16 to September 30.</p> <p>Graze 1 out of every 2 years from May 16 to September 30.</p>	<p>Graze 1 out of every 2 years from May 16 to September 30.</p> <p>Graze 1 out of every 2 years from May 16 to September 30.</p> <p>Graze 1 out of every 2 years from May 16 to September 30.</p>
Number of Water Facilities to be Developed	4 Springs 7 Reservoirs 4 Wells	2 Springs 2 Reservoirs 1 Well	2 Springs 3 Reservoirs	1 Spring 1 Reservoir
Miles of Fence to be Added or Removed	None	None	None	None
Livestock Changes	-34% (3 yr. average for Phase-In) - 8% (2 yr. average for Final Grazing Treatment)	-27%	None	-28%
Land Treatment	Spray 1,000 acres	1,000 acres; Respray existing seeding and spray projects.	Seed 200 acres	None
Implementation Schedule	Initiate Phase-In period; Start grazing system.	Continue present grazing system; Spray 1981	Develop waters 1981; Start Grazing System 1982	Develop waters 1981; Start grazing system 1982

TABLE 8-26
Proposed Management
SUB-UNIT 3

Management Area	Area 3A (141,000 acres)		Area 3B (159,000 acres)	
Grazing Proposal	3 pasture rest-rotation		3 pasture rest-rotation	
Season of Use	April 15 to May 15 May 15 to September 30	- - Seedings Native Range	April 15 to May 15 May 15 to September 30	- - Seedings Native Range
Key Vegetation	Bluebunch wheatgrass, bitterbrush		Basin Wild Rye	
Forage Utilization Limit (Key Species)	Moderate		Moderate	
Grazing Formula	J F M A M J J A S O N D ///////// ///////// ///////// REST	J F M A M J J A S O N D ///////// ///////// ///////// REST		
Number of Water Facilities to be Developed	12 Springs 12 Reservoirs 8 Wells		12 Springs 12 Reservoirs 12 Wells	
Miles of Fence to be Added or Removed	+20		+30	
Livestock Use Changes	No Change		No Change	
Land Treatment	10,000 acres; Plow and Seed 3,000 acres; Spray		11,000 acres; Plow and Seed 2,000 acres; Respray 2,500 acres; New Spray	
Implementation Schedule	Spray, plow & seed, develop waters; 1981 Construct fences; 1982 Start system; 1983		Spray, plow & seed, develop waters; 1981 Construct fences; 1982 Start system; 1983	

TABLE 8-27
Proposed Management
SUB-UNIT 4

MANAGEMENT AREA	A (50,000 acres)	B (95,000 acres)	C (132,000 acres)
Grazing Proposal	Less intensive management	Continue Crooks Lake AMP as is. 3 pasture rest-rotation on remainder.	4 pasture rest-rotation
Season of Use	May 1 to September 30	May 1 to September 30	May 1 to September 30
Key Vegetation	Idaho fescue, bitterbrush	Bluebunch wheatgrass	Bluebunch wheatgrass, bitterbrush
Forage Utilization Limit (Key Species)	Moderate	Moderate	Moderate
Grazing Formula	To be developed by livestock operators.	Crooks Lake - Deferred rotation (See Alternative 1) Remainder of Area B: J F M A M J J A S O N D ///////// ///////// ///////// ///////// REST	J F M A M J J A S O N D ///////// ///////// ///////// ///////// REST
Number of Water Facilities to be Developed	10 Springs	15 Springs 12 Reservoirs 12 Wells	16 Springs 14 Reservoirs 14 Wells
Miles of Fence to be Added or Removed	0	+15	+20
Land Use Changes	No Change	No Change	No Change
Land Treatment	None	Respray 3,000 ac. - Crooks Lake Allot. Spray 2,000 ac. - Remainder of area. Plow & Seed 1,000 acres	Spray 8,000 acres
Implementation Schedule	Develop springs; 1981	Develop waters, spray, plow & seed; 1981 Develop fences; 1982 Start grazing system; 1983	Develop waters & spray; 1981 Develop fences; 1982 Start grazing system; 1983

TABLE 8-28

Forage Consumption Summary (AUMs)

Sub-Unit/ Area	Livestock	Wild Horses	Deer ^{1/}	Antelope ^{1/}	Bighorn Sheep	Total
Sub-Unit 1	1,000	960	257	1,306	120	3,643
<u>Sub-Unit 2</u>						
Massacre Mtn.	4,639	240	387	138	-	5,404
North Nut Mtn.	1,458	1,161	213	207	-	3,039
South Nut Mtn.	4,893	486	362	112	-	5,853
Wall Canyon	2,963	500	203	12	-	3,678
Massacre Lake	1,917	1,053	64	106	-	3,140
Board Corral ^{2/}	1,433	500	196	20	-	2,149
Sagehen ^{2/}	416	176	204	20	-	716
<u>Sub-Unit 3</u>						
Area A	5,821	351	360	290	-	6,822
B	7,947	0	0	51	-	7,998
<u>Sub-Unit 4</u>						
Area A	2,121	122	1,544	0	-	3,787
B	6,121	850	185	131	-	7,287
C	10,379	0	926	871	-	12,176
TOTAL	51,108	6,399	4,801	3,264	120	65,692

^{1/} Represents actual quantity of livestock AUMs allocated for big game use. Due to dietary differences, the quality of forage for big game may be the limiting factor on populations. Actual use may therefore be less than allocation.

^{2/} Livestock AUMs listed for the Board Corral and the Sagehen Allotments are the permitted stocking rates during livestock use-years in these areas.

Impacts

Soils

There would be little change in erosion rates. Slight improvements would be expected in areas where livestock grazing is eliminated. Sensitive areas would continue to deteriorate since there would be no fencing around meadows, aspen stands, and riparian areas. Impacts on soil from vegetation manipulation would be as described in Alternative 5 but at a slightly lesser degree for Sub-Units 3 and 4. Sub-Units 1 and 2 would experience impacts similar to Alternative 2 through a 20 year period.

Water

Overall, water quality would not significantly change with this alternative. Water quality in sensitive areas would remain the same or continue to deteriorate. Impacts from vegetation manipulation would be as described for those alternatives where these activities are proposed (Proposed Action, Alternative 4, and Alternative 5).

Vegetation

Vegetative Condition and Trend: Range condition would improve on most of the study area. In 20 years, the acreage in poor condition class would decrease from 403,000 to 67,500; the acreage in fair would decrease from 437,000 to 363,000; the acreage in good would increase from 6,000 to 362,837; and 400 acres would improve to excellent condition (TABLE 8-29). The most significant improvement would occur on 3 and 4 pasture grazing systems and moderate improvement would occur on 2 pasture systems (TABLE 8-30). The 3 and 4 pasture systems would exhibit more rapid improvement since 2 years of growing season rest is provided for most vegetative species. The other systems generally allow only one growing season rest following use, which, as was described in Chapter 3, is inadequate for vigor recovery on heavily used sites. Improvement would occur on sites away from water.

Vegetative species that would show response to management would be the same as described for individual ecological sites in Chapter 3. Site characteristics which would affect the rate and degree of response would remain unchanged.

This alternative would have significant impact on those lands that receive brush removal and/or seeding treatments. Impacts of seeding 25,700 acres would be the same as described in Chapter 3 and Alternative 4 and impacts of brush removal treatment on 11,000 acres would be the same as described for Alternative 4.

Vegetative disturbance during the construction of water development and fencing projects would be as described in Chapter 3. Approximately 30 acres would be disturbed during spring construction, 180 acres during reservoir construction, 20 acres during well construction, and 103 acres during fence construction.

TABLE 8-29
Range Condition in 20 Years With Alt. 6

	Poor (Acres)	Fair (Acres)	Good (Acres)	Excellent (Acres)	Miscellaneous
Sub-Unit 1	5,906	20,500	40,690	370	11,554
Sub-Unit 2					
Massacre Mtn.	4,193	19,138	10,098	0	1,200
N. Nut Mtn.	13	2,996	36,472	0	417
S. Nut Mtn.	6,504	22,776	57,900	0	4,764
Wall Canyon	2,435	13,453	27,928	0	1,057
Massacre Lake	4,230	10,517	33,530	0	2,093
Board Corral	4,265	5,341	0	0	475
Sagehen	383	2,725	0	0	92
TOTAL	22,023	76,946	165,930	0	10,098
Sub-Unit 3					
Area A	17,534	53,376	26,724	0	33,530
Area B	2,619	112,319	24,375	0	19,687
TOTAL	20,153	165,695	61,099	0	53,217
Sub-Unit 4					
Area A	Unknown	Unknown	Unknown	Unknown	3,030
Area B	3,102	43,475	38,356	0	9,870
Area C	1,634	56,378	56,762	0	3,238
TOTAL	19,416	99,853	95,118		9,107
STUDY AREA TOTAL	67,499	362,994	362,837	370	91,007

TABLE 8-30

VEGETATIVE CONDITION IN 20 YEARS WITH ALTERNATIVE 6A

Ecological Site	Present Condition	East Side of High Rock Canyon	Area 4A	West Side of High Rock Sub-Unit 2 (Excluding North Nut Mtn.), AMP Portion of 4B			Area 4C
				3A, 3B, 4B, & N. Nut Mountain			
1. Shadscale/Indian Ricegrass	Poor	Poor	Poor	Poor	Poor	Poor	Poor
2. Greasewood/Basin Wildrye	Poor	Poor	Poor	50% Poor, 50% Fair	Fair	Fair	15% Poor, 85% Fair
3. Greasewood-Rabbitbrush/ Basin Wildrye	Poor	Poor	Poor	50% Poor, 50% Fair	Poor	Poor	Poor
4. Low Sage/Sandberg Bluegrass	Fair	Good	Fair	15% Fair, 85% Good	Good	Good	Good
5. Low Sage/Bluebunch Wheatgrass	Fair	Good	Fair	15% Fair, 85% Good	Good	Good	15% Fair, 85% Good
6. Low Sage/Idaho Fescue	Fair	Good	Fair	Good	Good	Good	Good
7. Juniper-Low Sage/Idaho Fescue	Poor	Fair	Poor	50% Poor, 50% Fair	Fair	Fair	15% Poor, 85% Fair
8. Big Sage/Bluebunch Wheatgrass- Indian Ricegrass	Fair	Fair	Fair	Fair	Fair	Fair	Fair
9. Big Sage/Bluebunch Wheatgrass	Poor	Fair	Poor	50% Poor, 50% Fair	Fair	Fair	15% Poor, 85% Fair
10. Big Sage/Idaho Fescue	Fair	Good	Fair	N/A	N/A	N/A	N/A
11. Big Sage/Basin Wildrye	Poor	Poor	Poor	50% Poor, 50% Fair	Fair	Fair	15% Poor, 85% Fair
12. Juniper-Big Sage/Bluebunch Wheatgrass	Fair	Good	Fair	50% Fair, 50% Good	Good	Good	15% Fair, 85% Good
13. Bitterbrush/Idaho Fescue	Poor	Good	Fair	Good	Good	Good	15% Poor, 85% Fair
14. Mountain Mahogany/Western Needlegrass	Fair	Good	Fair	N/A	N/A	N/A	N/A
15. Silver Sage/Mat Muhly	Poor	Fair	Poor	25% Poor, 75% Fair	Fair	Fair	Fair
16. Baltic Rush	Fair	Good	Poor	50% Fair, 50% Good	Good	Good	Good
17. Aspen/Slender Wheatgrass	Poor	Good	Poor	50% Fair, 50% Good	N/A	N/A	N/A
18. Tufted Hairgrass-Bluegrass	Poor	Excellent	Poor	50% Fair, 50% Good	Good	Good	Fair
19. Willow/Tufted Hairgrass- Bluegrass	Poor	Excellent	Poor	50% Fair, 50% Good	Fair	Fair	Fair

Vegetative Production: Livestock forage production would increase from the present 55,000 AUMs to 69,198 AUMs upon implementation of this alternative (TABLE 8-31). These initial forage increases result from delaying turnout dates, providing deferment or rest and development of seeding and brush removal projects. Studies conducted by Hormay (1970) indicate the following forage increases due to deferment or rest: May 1, 17 percent increase; May 15, 23 percent increase; June 15 or complete rest, 28 percent increase. Initial forage estimates incorporate these increases to arrive at initial production and stocking levels. Seeding would provide an additional 6,425 AUMs (4 acres per AUM), brush removal on 2,000 acres of existing land treatments would provide an additional 200 AUMs (10 acres per AUM) and brush removal on 9,000 additional acres would provide 1,800 AUMs (5 acres per AUM).

As range conditions improve, the production of ecological sites would improve. Using Anderson's (1978) stocking rate guides, the livestock forage in 20 years is estimated to be approximately 158,936 AUMs.

Threatened and Endangered Plants: This alternative would have impacts similar to the proposed action. Any improvement in range conditions would generally enhance species that may occur.

Livestock Grazing

Impacts would vary between management areas, but they would be primarily beneficial since modification or adjustments to existing operations would be minimal.

Wildlife

There would be a slight to moderate improvement in wildlife habitat condition. A corresponding improvement could be expected in wildlife numbers and condition. Water developments will improve water distribution for wildlife. Fences would create a minor impediment to big game movements. Big game populations would increase to 2,330 deer and 2,200 antelope.

Impacts of land treatments would correspond to impacts discussed for the respective types of treatments for the Proposed Action, Alternative 4, and Alternative 5.

Wild Horses

Wild horse numbers would be reduced from 705 to 290. There would be a reduction in the amount of area grazed and the intensity of grazing by wild horses. This would contribute to improved vegetative responses on areas that are currently grazed season long by horses.

Cultural Resources

The impacts upon cultural resources would be similar to the continuation of present management (Alternative 1) save that the elimination of cattle grazing in Sub-Unit 1 would result in a substantial reduction in the trampling which presently threatens the approximately 1,950 archaeological sites

TABLE 8-31

Livestock Forage Production

	<u>Initial AUMs</u>	<u>AUMs in 20 Years</u>
Sub-Unit 1	8,103	12,009
Sub-Unit 2		
Massacre Mountain	6,018	6,636
N. Nut Mountain	2,815	7,135
S. Nut Mountain	6,568	10,569
Wall Canyon	3,175	5,866
Massacre Lake	2,117	6,321
Board Corral	1,475	2,688
Sagehen	416	833
Sub-Unit 3		
3 A	9,854	15,894
3 B	10,702	31,438
Sub-Unit 4		
4 A	2,121	2,315
4 B	7,408	13,655
4 C	<u>14,529</u>	<u>43,577</u>
TOTAL	67,198	158,936

comprising the High Rock Complex. Continued sheep grazing on the west side of High Rock Canyon could negatively affect a portion of the approximately 1,200 archaeological sites believed to lie in that portion of Sub-Unit 1, but the manner of sheep herding allows animals to be directed away from sensitive zones. Maintenance of a small herd of wild horses would have a slight but incremental affect. Elsewhere, approximately 19,000 predicted sites (15,000 of them on public land) would continue to suffer varying degrees of trampling, with the impact magnified at water sources. Thirty-eight (38) known properties of National Register quality would be affected, including 13 which lie where livestock congregate. Further, as range response to the proposed grazing systems would not result in rapid reversal of downward trends in conditions, continued or increased erosion (and thus continued or increased attrition) of the cultural resource base would occur throughout the study area.

The seeding of 25,700 acres, the development of 250 water sources, and the construction of 100 miles of pasture fence, if not preceded by cultural resource surveys and the design of appropriate measures of avoidance or mitigation, could result in the disturbance or destruction of a presently unpredictable number of cultural sites, several of which (especially those at water sources) are likely to be candidates for the National Register.

Recreation

Impacts would be similar to those discussed for the proposed action.

Visual Resources: Impacts would also be similar except that continued sheep grazing in High Rock would result in a lesser degree of improvement in the aesthetic qualities of that area.

Wilderness: Impacts would be slightly greater than under Alternative 1 due to additional developments, except for Sub-Unit 1 where removal of livestock from the east side of High Rock Canyon would yield high positive benefits while continued sheep grazing on the west side would continue to impact (though to a lesser extent), vegetation, soils, water quality, wildlife and archaeological resources.

Social and Economic Conditions

Alternative 6 would have negligible effects on the AUMs permitted on the public lands (see TABLE 8-32). However, the proposed grazing systems would require uniform cattle numbers throughout the season. The associated reduction in permitted animal units during the spring would require 22 of the 34 permittees to develop additional sources of feed during the spring. Permitted cattle numbers during the summer would not, in most cases, increase significantly over present summer use. In those cases where summer increases occur, they would be of limited value since the ranchers now have established private or federal grazing areas that they move into after the early season use on BLM.

TABLE 8-32

Present and Proposed Livestock Use
Under Alternative 6 - By Operator

	Present Use (AUMs)	Use Under Alternative 6 (AUMs)
Berryessa	2,178	2,178
Bordwell	1,040	1,040
Bunyard	3,248	2,404
L & L Cattle Co.	3,133	3,133
Carey, F. & J.	121	121
Carey, P. & J.	154	154
Cockrell's	177	177
Coops	1,702	1,458
Earp	8,283	4,229 ^{1/}
Hill	722	0/716 ^{1/}
Fee	3,371	3,371
Hapgood	496	496
Harris	895	895
Heryford	1,100	1,036
Hill, Norene	2,004	2,004
Hussa	1,838	1,693
Jones	392	392
Kirkpatrick	2,433	2,433
Kyte	1,111	1,111
Laxague	1,104	1,104
Marx	1,588	1,000
Page	352	352
Parman, J.	1,364	641/1,358 ^{1/}
Parman, R.	128	128
Peterson	369	369
Quirk	560	560
Schadler, G.	57	57
Schadler Ranch	6,315	6,315
Smith	166	166
Steward	560	560
Warren's Ranch	1,548	1,548
Weber	7,076	6,461/6,740 ^{1/}
Wolfsen's	1,145	1,145
 TOTAL	 56,730	 51,108

^{1/} The first figures for Hill, Joe Parman, and Weber are for the permitted stocking rates during non-use years (1 of 3) in the Board Corral and Sagehen Allotments.

Additional labor costs would confront all but four of the permittees. This would result from the proposed multi-pasture systems in this alternative. Since the fence lines and rotation schedules are not known at this time, the added costs cannot be quantified. However, moving cattle from pasture to pasture and, to a greater extent, gathering and separating cattle at the end of the season could increase labor requirements by up to two weeks for some operators. (This is based on the time spent at present on gathering and separating by the three operators in the Wall Canyon Allotment.)

Five ranchers would be substantially affected due to additional feed costs but none of them would be likely to be forced out of the livestock business. Extensive changes would have to be made in either land use or herd management by these operators to feed about half the number of cattle they now run on the public lands during spring. The number of cattle to be grazed is shown in FIGURES 8-3 through 8-6 for each permittee.

Changes in the social structure would probably be insignificant.

Impacts -- Sub-Unit 1, High Rock

Vegetation

Vegetative Condition and Trend: Vegetative response on the east side of High Rock Canyon would be the same as described for Sub-Unit 1 in the proposal. Sheep grazing during the spring and fall would be detrimental if use is concentrated on the same areas each year. However, since total forage consumption would be reduced significantly, it is anticipated that the condition on approximately 50 percent of the area of sites having high recovery potential would improve (TABLE 8-30).

Vegetation Production: Cancellation of grazing in the High Rock Canyon Unit would provide initial forage increases of approximately 28 percent. As forage conditions improve, the production in 20 years would increase to approximately 12,000 AUMs.

Livestock Grazing

Impacts from cancellation of cattle grazing on the High Rock Canyon Unit would be the same as those described for Alternative 2. Sheep performance and lamb weights would improve due to increased forage availability and improved range conditions on the west side of the unit.

Wildlife

Deer: Elimination of cattle, would benefit the deer population by reducing competition for browse. Retaining sheep use would also retain spring competition for forbs on the west side of the canyon. Deer numbers would be expected to increase from 100 to 130.

Antelope: Antelope would be similarly impacted by elimination of forb competition on the west side. However, all competition with livestock would be eliminated on the east side. Antelope habitat would improve to support a potential population of 900 antelope, double the existing numbers.

Bighorn Sheep: Although sufficient forage allocations have been made, the retention of domestic sheep grazing in High Rock Canyon would reduce the potential for reintroduction of bighorn sheep in the area. This is due primarily to the increased possibility of disease transmission rather than competition for forage (as described under Alternative 4).

Sage Grouse: Sage grouse would be beneficially impacted by prescribed cattle grazing only. Forb competition would be reduced by 75 percent by removal of cattle on the west side and by 100 percent on the east side of High Rock Canyon. Prescription grazing would allow manipulation of meadows to remove the rank vegetation that ultimately reduces meadow values to sage grouse.

Continuation of domestic sheep on the west side would retain some nest disturbance and some forb competition. Increases in productivity and population levels would be slightly slower on the west side of High Rock Canyon.

Quail: Improvement of water sources and vegetative recovery on riparian and meadow sites would lead to a potential increase in quail populations. Realized increases would be dependent upon favorable climatic conditions.

Nongame Species: Termination of cattle grazing would reduce vegetation removal by 75 percent. This would lead to better structure and cover for some nongame species. Small mammal species richness would decrease significantly on mesic areas while bird species richness would show slight changes. However, species densities would be likely to increase dramatically. These changes would be more evident and would occur earlier on the east side of the canyon. Similar changes would occur on the west side, but the degree would be lower and rate of change would be much slower.

Raptors: The raptor population in High Rock Canyon would not be expected to change as a result of this alternative because suitable nest sites are the apparent limiting factor. However, productivity would be expected to increase as a result of increased prey base.

Wild Horses

Wild horse numbers would be reduced by 295 animals as a result of Alternative 6.

Cancellation of cattle grazing in the sub-unit will increase the amount of available forage for horses. Reducing to a maximum of 80 will insure a healthy, viable population in the area.

Wilderness

Eliminating livestock grazing from the east side of High Rock Canyon would have the same positive impacts as for the proposed action. Retention of sheep grazing on the west side of High Rock Canyon would continue to impact vegetative growth, trample archaeological sites, compete with wildlife for forage, decrease water quality and soil stability, and preclude the reintroduction of bighorn sheep because of disease transmittal. However, elimination of cattle grazing except on a prescribed basis would lessen these cumulative impacts and result in overall increases in deer and antelope populations for hunting and viewing opportunities.

Social and Economic Conditions

Alternative 6 would cancel all cattle grazing in Sub-Unit 1, but would allow sheep use to remain on the west side.

Bunyard: Bunyard would be required to make moderate adjustments in his operation as a result of implementation of this alternative. Although his traditional sheep use areas would be available for use, some AUM reduction would be imposed as a result of the cancelation of grazing in Sub-Unit 1. This reduction combined with the grazing systems required on the remaining use areas, would require some modification to both Bunyard's cattle and sheep operations. The exact nature of these modifications could be assessed only after development of grazing system specifics.

Earp: Earp's operation would probably face substantial changes as a result of the implementation of this alternative. The loss of AUM's, development of grazing systems and moderate use would result in reductions which could exceed 48 percent.

Impacts -- Sub-Unit 2, Massacre Mountain/Nut Mountain

Vegetation

Massacre Mountain:

Vegetative Condition and Trend: Impacts on native vegetation would be similar to those discussed for Area 2E under Alternative 5.

Vegetative Production: Production would initially increase by 17 percent due to the delay in turnout. Production would approximately double over the 20 year period as ecological condition improves.

North Nut Mountain:

Vegetative Condition and Trend: Impacts on native range would be the same as those described for Area 2A of the proposed action since both propose grazing once every three years.

Vegetative Production: Implementing grazing systems would provide forage increases on the native range. Deferring turnout dates on the use year until May 15 would increase production by approximately 23 percent and completely resting the area would provide 28 percent forage increases.

South Nut Mountain:

Vegetative Condition and Trend: Moderate improvement in range condition would occur. Insufficient rest would be provided for plants which are heavily utilized to recover vigor (Hormay, 1970). Grasses and forbs would have one growing season of rest following grazing during the critical growing period. Browse species that are damaged by grazing at any time during the year would receive use during both the early and seedriple treatments. Recovery of these species would not be anticipated.

Vegetative improvement would be anticipated on approximately 80 percent of the area of sites which have high recovery potential (TABLE 8-30).

Vegetative Production: Deferment of native range until May 1 would result in approximately a 17 percent increase in forage production on one pasture and deferment until seedriple on one pasture would result in approximately a 28 percent increase in forage production (Hormay, 1970).

Seeding 4,000 acres would have impacts similar to those discussed for the proposed action in Chapter 3. Initial production of seedlings would be approximately 1,000 AUMs. Initial forage production would be approximately 6,100 AUMs and would increase to 9,331 AUMs as range conditions improve over a 20 year period.

Wall Canyon: Impacts would be similar to those described for the Nut Mountain Allotment. Exceptions would be those impacts resulting from April 15 turnout dates. This early turnout date would limit the amount of forage production in the early use pasture.

Spraying 1,000 acres would provide approximately 200 AUMs of additional livestock forage. This would allow the early turnout date to be maintained without livestock reductions. Impacts of spraying would be the same as those described in Alternative 4.

Vegetative Production: Turnout on May 1, providing deferment until September 1 on pasture, and spraying 1,000 acres will increase initial forage production from 2,700 AUMs to 3,500 AUMs. As range conditions improve, production would increase to 5,200 AUMs.

Massacre Lake: Vegetation improvement would occur on most of this area.

Impacts would be similar to those discussed for Management Area 2C in Alternative 5. Impacts of spraying would be as discussed in Alternative 4.

Board Corral and Sagehen:

Vegetative Condition and Trend: Impacts would be similar to those discussed for Management Area 4C in Alternative 5. Impacts of spraying would be similar to those discussed in Alternative 4.

Vegetative Production: The May 15 turnout date would increase livestock forage production by approximately 23 percent. Long term increases would be predicted since vegetative improvement would occur. Spraying 5,000 acres would increase production by approximately 1,000 AUMs. Seeding 200 acres would increase total production only slightly.

Livestock Grazing

Maintaining present allotment boundaries and areas of use would be beneficial for livestock management. Additional trailing and sorting time would not be required since livestock herds from different allotments would not be mixed together. Current calving dates and the year round operations would require little change. With the exception of the Massacre Mountain, Sagehen, Wall Canyon, and Board Corral Allotments, turnout dates would remain unchanged. May 1 and May 15 turnout dates on these allotments would require herd sizes to be reduced or additional forage to be produced or purchased. Total livestock use on Sagehen and Board Corral Allotments would be reduced because of limited potential for brush removal or seeding projects to provide additional forage. Livestock use on the North Nut Mountain and Wall Canyon Allotments would be slightly reduced in order to coordinate management with their use on the Sheldon Antelope Refuge. This level of use would allow a stable herd size to be grazed each year. Livestock use on other allotments would remain unchanged or increase. Range improvement on a portion of the area and additional water development would improve livestock performance and calf weight.

Wildlife

Massacre Mountain:

Deer: Providing two growing seasons rest out of three on segregatable bitterbrush areas will improve seed production and condition. Deer populations would be expected to increase from 50-60.

Antelope: Antelope populations would nearly double (110 to 200), primarily as the result of meadow, mountain brush and low sage habitat improvement and the existing upward trend in antelope populations. Bitterbrush and forbs compose up to 86 percent of pronghorn diets during the summer (Baker, 1953; Beale and Smith, 1970; and Nevada Dept. of Fish and Game, 1978). Neighboring Modoc County antelope populations have increased 163 percent since 1960 (Pyshora, 1977).

Sage Grouse: Meadow healing would also lead to increased productivity of sage grouse and greatly improve chick survival (Oakleaf, 1971). Improved grass understory in sagebrush habitats should also improve nesting success. The dependence of sage grouse on grass understory in suitable nesting areas is well documented (Wallestad and Pyrah, 1974, Patterson 1952, Nevada Dept. of Fish and Game 1975). Sage grouse populations, especially in North Nut Mountain would be expected to increase moderately.

Nongame Species: Nongame birds and small mammals would increase in diversity and density in most habitat types. This in turn could lead to increased raptor productivity. However, overall populations of cliff nesting raptors would not be expected to increase.

North Nut Mountain:

Deer: Keying utilization to bitterbrush and limiting it to moderate use would ensure increased winter browse for deer. Resting the entire area two years out of three would reduce competition and improve bitterbrush condition and vigor. Removal of livestock on August 15 would further reduce competition and improve browse condition. Deferring turnout on native range until May 15 would reduce competition during spring green-up. Reduction of early and late competition every third year and total elimination of competition the other two years would significantly increase productivity. Deer numbers would increase by 25 percent to 250 animals.

Antelope: Spring competition for forbs would be eliminated two years out of three. Plowing and seeding 3,000 acres would have positive short term impacts, but antelope use would ultimately be eliminated from 15 percent of the area as grasses outcompete forbs. This impact would be partially compensated for by postponing use of native range for 30 days. Deferment of use on native range until May 15 would reduce forb competition during the critical late prenatal period. Antelope numbers would increase from 120 to 180.

Sage Grouse: Sage grouse would be negatively impacted by plowing and seeding 3,000 acres of big sage habitat. However, nest disturbance and spring forb competition would be significantly reduced during the first year and totally eliminated the second and third years of the cycle. Overall sage grouse productivity and population levels would be expected to show substantial increases.

Nongame Species: As general range condition improves, nongame wildlife use would change and increase dramatically. Rest two years out of the three and early and late rest the third year would result in dramatic increases in bird use and small mammal abundance and species richness.

South Nut Mountain:

Deer: Deferment until seedripeness on 50 percent of the area will increase grass and forb availability during the early spring green-up period. Productivity may be increased resulting in a 10 percent increase in deer numbers from 150 to 165.

Antelope: Spring competition for forbs would be eliminated on 50 percent of the area each year. This benefit will be partially negated by the increased intensity of grazing in the early use pasture. Increase forage production resulting from later turnout dates on native range and seedripening treatment would allow antelope populations to increase from 40 to 50.

Sage Grouse: Removal of nesting cover and forb competition will be increased in the early use pasture and reduced in the seedripening pasture. Overall sage grouse productivity would not change significantly.

Nongame Species: Nongame species would be affected as described for Management Area 4C in Alternative 5.

Wall Canyon:

Deer: Deferment of turnout dates would increase grass and forb availability during the early spring green-up period in both treatments. During the early treatment, cows would be removed before they turn to bitterbrush, thus resting it every other year. However, the fall treatment every other year would allow heavy, unchecked use of bitterbrush because it is not listed as a key species in determining utilization. The system would not allow for sufficient recovery of bitterbrush. The habitat would improve slightly and support a population increase from 125 to 135 deer.

Antelope: Forbs would be available to antelope without competition on 50 percent of the area each year. However, the lack of recovery of bitterbrush would adversely affect antelope. Habitat would improve only slightly. Antelope numbers would increase from about 50 to approximately 60.

Sage Grouse: Sage grouse would be negatively impacted by spraying 1,000 acres of big sagebrush habitat. Removal of nesting cover and forb competition would be increased during the early use treatment. However, these negative impacts would be absent during the late use treatment. Overall sage grouse productivity would be expected to decline moderately.

Nongame Species: As general range condition improves, nongame wildlife would change as described under other grazing systems where upland habitat types improve slowly. However, these changes would be even slower and less dramatic than in systems aimed at improving browse, meadow, and other crucial habitat types as well as perennial grasses.

Massacre Lakes: Impacts would be similar to those discussed in Alternative 1 for Management Area 2C.

Board Corral:

Deer: Increased bitterbrush availability and slightly improved condition should lead to improved physical condition, higher fawn survival, and reduced mortality rates within the deer population. Lack of improvement in condition due to inadequate rest would limit deer population to a slight increase of from 100 to approximately 110 animals.

Antelope: Competition between antelope and livestock would be reduced. Resting the area every other year and delaying turnout until May 15 would ensure slightly higher forb availability for antelope during the late prenatal period. The 50 antelope occurring in Board Corral would be expected to increase to 65.

Sage Grouse: Nesting cover removal and spring competition for forbs would be reduced providing beneficial impacts on sage grouse. Sage grouse populations would be expected to increase slightly.

Nongame Species: Habitat structure for nongame birds and small mammals would improve as a result of the increase in vegetation (due to the May 15 turnout). The density of most nongame species would increase accordingly while diversity remains unchanged. Population densities would be even higher during rest years.

Sagehen: Wildlife impacts in this area would be the same as in Board Corral, except only 50 deer would be affected.

Wild Horses

Increased water availability and improved range conditions should improve the health of wild horses. Retaining existing allotment boundary fences would have the same negative impacts described for Alternative 1. Construction of additional fences could create a potential hazard to wild horses.

Wilderness

Impacts would be similar to Alternative 1 with some increased impacts from additional developments.

Social and Economic Conditions

Most of the 9 operators in Sub-Unit 2 would benefit from the adoption of Alternative 6. The 4 operators in the North Nut Mountain and the Wall Canyon Allotments would not face any changes in numbers or in seasons of use. Designing a grazing system in these two allotments has been the subject of joint discussions among representatives of the BLM and the Fish and Wildlife Service and the permittees in this area. A tentative coordinated plan has been proposed, with implementation subject to land use decisions by BLM and USFWS. This plan, if adopted, would have beneficial impacts on Coops, Heryford, Hussa, and Weber.

The two operators in the Board Corral Allotment would need to find additional feed sources under this alternative. Grazing would be allowed only 2 out of 3 years. Hence, feed for about 125 head would have to be found by each of these permittees every third year. This would offset the benefits realized by the increase of about 95 head permitted during the 2 use years.

Overall, although impacts will vary among the different permittees, this alternative will have minor economic impacts on the ranchers in Sub-Unit 2.

Impacts -- Sub-Unit 3, Long Valley/Sand Creek

Vegetation

Management Area 3A and 3B: Impacts would be the same as those described for Management Area 4B in Chapter 3. Plowing and seeding would have the same impacts described in Chapter 3. Spraying 7,500 acres could have impacts similar to those described for Alternative 4. Differences exist only in the amount of acreage treated.

Livestock Grazing

Improved range condition and increased livestock forage would improve livestock performance and weights. Additional herding and trailing time would be required to follow the grazing system.

Wildlife

Management Area 3A:

Deer: Condition and vigor of deer browse and cover plants would improve slightly as the result of rest and seed ripe treatments. Bitterbrush could continue to be overbrowsed, but keying utilization to bitterbrush would reduce the level of impact. Competition for food would be eliminated on 30,000 acres each year. Overall health and condition of deer would improve as a result of increased forage availability. The deer population would be expected to increase by 10 percent to a level of 175.

Antelope: Spring competition for forbs would be reduced on two-thirds of the area. Increases in abundance and variety of forbs would be expected throughout the area, as a result of the three pasture system. Increases in forage availability would yield improved health, better survival, and an overall increase in antelope productivity. Antelope would be expected to increase by 50 percent achieving a population level of 200 wintering and 250 summering antelope.

Sage Grouse: Important meadows would be free of competition with livestock for nesting cover and forbs during the brooding season on two-thirds of the area. However, nearly 10 percent of the area would be sprayed or plowed and seeded. This would eliminate 13,000 acres of big sage which is essential for sage grouse nesting. The overall effect on sage grouse population would be significantly increased productivity on 60 percent of the area each year, but only a slight net increase in population.

Nongame Species: The moderate use limitation and deferred and rested grazing treatments would result in an increase in bird and small mammal use. Vagrant shrews, pocket mice, Savannah sparrows, and red-winged blackbirds would be expected to increase in numbers and deer mice, kangaroo rats, Brewers sparrows and horned larks would be expected to decrease in percent composition in 90 percent of the management area. The opposite would be true in the 10 percent of the area receiving cultural treatments.

Aquatic/Riparian Habitat: Fencing Sand Creek would have dramatic beneficial impacts on wildlife as described for the proposed action.

Management Area 3B: Wildlife impacts would generally be the same as Management Area 3A. However, failure to key utilization to a browse species would allow what little there is to continue to be overbrowsed. This would have little effect on the overall deer and antelope populations. Bird and small mammal species composition would be slightly different due to the differences in existing ecological sites. The general trend of increased abundance and species richness would be the same.

Wild Horses

Wild horses would be reduced from 31 to 20. Improved range conditions and forage availability would benefit remaining horses. Additional pasture fencing would create potential hazards and possibly interrupt present movement patterns.

Wilderness

Impacts would be similar to Alternative 1 with some increased impacts from additional developments.

Social and Economic Conditions

Most of the 18 ranchers licensed for use in Sub-Unit 3 would be only slightly affected by this alternative. Mid-April turnout dates would remain unchanged for all of the operators except for two, who now turnout on May 1. Permitted numbers would decrease slightly for 12 of the permits. Minor management changes would necessarily be made by these operators to adjust to this alternative. Four of the permittees in this sub-unit would incur higher cost increases under this alternative due to larger reductions in permitted numbers for all or part of the grazing season.

Impacts -- Sub-Unit 4, Mosquito

Vegetation

Management Area 4A: Impacts would be the same as those described for the proposed action in Chapter 3.

Management Area 4B: Impacts on the Crooks Lake AMP portion of this sub-unit would be similar to those described for Alternative 1. Differences would occur on 3,000 acres that would be sprayed. Impacts of spraying would be as described in Alternative 4. The impacts on the remainder of this sub-unit would be similar to those described for this area in Chapter 3. Minor differences exist as a result of May 1 turnout dates, spraying 2,000 acres and seeding 1,000 acres. Turnout at May 1 would result in forage production increases of approximately 17 percent compared to forage production increases of approximately 23 percent at May 15 turnout dates. Impacts associated with seeding 1,000 acres would be the same as those described in Chapter 3 and impacts associated with spraying 2,000 acres would be the same as those described in Alternative 4.

Management Area 4C: Implementation of this grazing management system would improve range conditions on most of the area. The grazing formula would not provide late maturing perennial grasses, such as Idaho fescue or bluebunch wheatgrass, adequate rest to recover vigor if they are grazed heavily. These species would not be expected to recover on areas immediately adjacent to water sources or on other livestock concentration areas that would be grazed heavily (Hormay, personal communication, 1978). Moderate use restrictions would limit forage utilization but livestock concentration areas would still remain. Early maturing species such as the bluegrasses and squirrel-tail would receive three years of growing season rest after being grazed during their critical growth period and would improve adequately. Bitterbrush would receive grazing use two years out of four. Studies show that no appreciable use is made on this species prior to June 15 (BLM, 1977) and it would be completely rested one year. Recovery of bitterbrush vigor, seed production, and seedling establishment would be satisfactory.

Since the physiological growth requirements are not completely satisfied for late maturing grass species it is anticipated that the condition on approximately 85 percent of the area of sites which have significant amounts of these species would improve (TABLE 8-30).

The May 1 turnout date would increase forage production approximately 17 percent above present levels.

Impacts associated with spraying 8,000 acres would be the same as those described in Alternative 4.

Livestock Grazing

Impacts would be beneficial within this area. Impacts on Management Area 4A would be the same as those described for the proposal in Chapter 3. A two week later turnout on Areas 4B and 4C would require additional forage to be produced or herd sizes to be reduced. Improved range conditions and increased availability of forage would improve livestock performance and weights. Additional herding and livestock management time would be required to move cattle between pastures.

Wildlife

Management Area 4A: Impacts would be similar to those described for the proposed action.

Keying utilization to bitterbrush would benefit 600 wintering deer by ensuring a 20-40 percent increase in available browse.

Not fencing meadows and aspen would result in their continued decline. Negative impacts on sage grouse due to spring forb competition, meadow degradation, and nest cover removal would continue.

Management Area 4B: Impacts to wildlife under continuation of the Crooks Lake AMP were discussed under Alternative 1. Therefore, the following discussion applies only to the remainder of Management Area 4B.

Deer: Overall impacts to deer would be positive. Bitterbrush would continue to be overbrowsed, but overbrowsing would be reduced by an estimated 10 percent. Forage competition would be eliminated on one-third of the area each year, and on two-thirds of the area during the fawning season and first six weeks of nursing. Does would be healthier and would produce stronger fawns more capable of surviving. The May 1 turnout would further increase forage availability. Deer would be expected to increase from 75 to 90.

Antelope: The three pasture system would be expected to produce an increase in the density and variety of forbs, which are important spring food plants for antelope, in most habitat types. Competition for early spring forage between livestock and antelope would be eliminated on two-thirds of the area. The early use pasture would continue moderate competition between livestock and antelope on 30,000 acres. The net result would be an increase in general condition and productivity of antelope and population increase from 60 to 90 wintering and from 190 to 285 summering animals.

Sage Grouse: Increased plant vigor, increased vegetative density, increased abundance of grasses and forbs, and not grazing two-thirds of the area during the brooding season would all benefit sage grouse. Forage competition and removal of nesting cover would continue in the early use pasture. Meadows would improve, though not as rapidly as if fenced. Sage grouse populations would be expected to show a moderate increase.

Nongame Species: Moderate use limitations and deferred and rested grazing treatments would improve habitat structure and food availability for most nongame species. Bird and small mammal use would be expected to show a substantial increase similar to those described in Chapter 3.

Management Area 4C:

Deer: Browse availability would increase by about 10 percent. Deferment and rest treatments would increase vigor of browse species and defer livestock use of browse by increasing perennial grasses. Browse competition would be eliminated on 50 percent of the area each year. At least 50 percent of the area would be free from general forage competition during fawning and nursing periods. Deer numbers would be expected to show an increase from 400 to 450.

Antelope: Antelope would benefit from the increased forb densities resulting from deferred treatments, total elimination of forage competition on 25 percent of the area and near elimination of competition in the late use pasture. Antelope habitat would improve to support a potential population in the management area to a level of 600 antelope.

Sage Grouse: Nest disturbance and forb competition would be eliminated during the brooding season on 50 percent of the area, and up to the peak hatching period in an additional 25 percent. Spraying would remove 8,000 acres of abundant but crucial big sage habitat. The net result would be a moderate increase in sage grouse productivity and population size.

Nongame Species: Plant diversity, percent cover, and structure and food supply for most nongame species would increase. Bird use should increase dramatically and species richness would show a significant increase. Small mammal populations would show similar increases as described in Chapter 3.

Aquatic/Riparian Habitat: Fencing Twelve Mile and Coleman Creeks will have the same beneficial impacts described for the proposed action.

Wild Horses

Impacts in Management Area 4A would be the same as described for Alternative 1. Impacts in Management Area 4B will be beneficial. Improvement in range condition and increased forage availability will improve the health of wild horse herds. Impacts of fencing would be the same as those described for the proposed action in Chapter 3.

Wilderness

Impacts would be similar to Alternative 1 with some increased impacts from additional developments.

Social and Economic Conditions

Because of the present patterns of use by most of the 15 permittees in Sub-Unit 4, which is heaviest during the spring, conversion to season-long grazing systems would require moderate cost increases for eight of these operations. Costs for some of these operators would run up to \$17,000 from pasturing the cattle removed from the public range on inside meadows. The remaining seven ranchers with permits in this unit would be slightly affected by Alternative 6's proposed changes in their permits.

Mitigation

Each of the mitigation measures enumerated in Chapter 4 is appropriate if this alternative is implemented. These measures would apply to all range treatments, water developments, and pasture fence construction. The Cultural Resources Monitoring and Inventory Program will encompass the entire study area excluding only the east side of High Rock Canyon. A cultural resource management plan will be developed for Sub-Unit 1. Grazing components of the plan will define trailing practices for the sheep herd to avoid compromising significant cultural values.

The two pasture systems would be modified to provide two growing seasons rest during every three years on significant mountain brush sites. This would be accomplished using the prescriptive management specified for mountain brush sites under Sand Creek in TABLE 4-2. This would provide twice as much growing season rest and would significantly reduce the adverse impacts associated with grazing pressure in livestock concentration areas.

Unavoidable Adverse Impacts

The unavoidable adverse impacts which would occur under this alternative are as described in Chapter 4 and under Alternative 4. The adverse effects of vegetation manipulation and range treatments are discussed in Chapter 3.

With the exception of the High Rock Unit, implementation of this alternative would perpetuate livestock related impacts on cultural resources throughout the study area. Known properties of National Register quality would be protected through the enactment of mitigation measures, and site specific, pre-project 106/2(b) compliance would prevent inadvertent adverse effects during the course of construction, but a large number of potential National Register sites, so far unidentified, would lie within the zones of direct livestock related impacts and would go unrecognized and unprotected until discovered by the inventory program. Irretrievable losses of information would occur in the time intervening.

Unavoidable impacts to the Wilderness resource in Sub-Units 2, 3, and 4 would be similar to those for Alternative 1 with some increased visual impacts from additional developments.

Reductions in permitted numbers during the spring would require most operators to either purchase hay or lose some production on their non-federal inside meadows. The costs associated with this spring loss would adversely affect about 5 permittees. The replacement feed costs would range from \$10,000 to \$15,000 per year. Cancellation of grazing in Sub-Unit 1 could cost one cattle rancher \$30,000 per year. Although the total economic effect of these dollar losses cannot be accurately assessed, major ranch management changes would be required of several ranchers in order for them to maintain viable operations.

ALTERNATIVE 7 - ALTERNATIVE METHOD FOR DETERMINING STOCKING LEVELS

Description

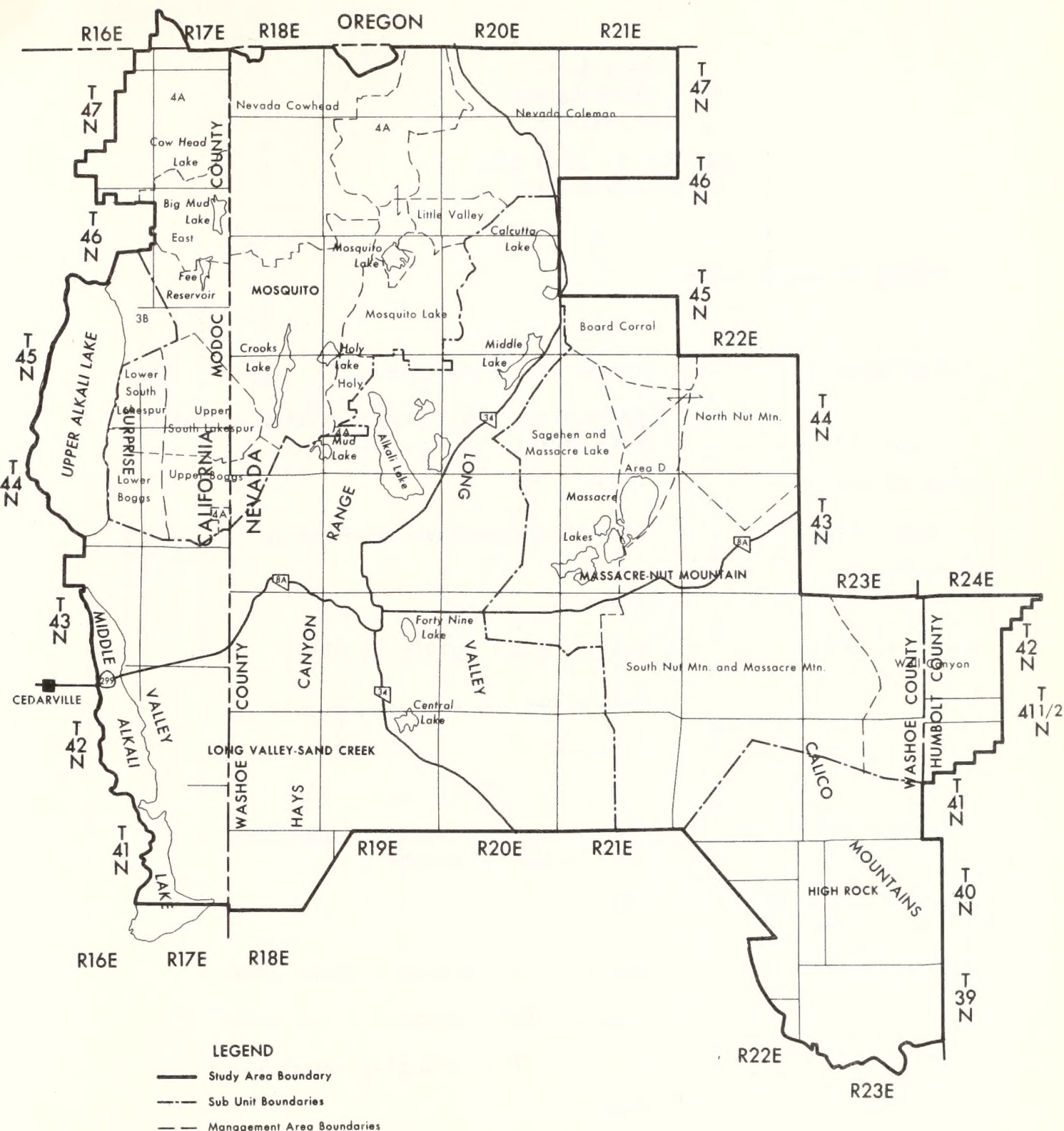
This alternative emphasizes minimizing economic disruption to livestock operators while still effecting a high degree of range improvement and overall resource enhancement. The principal elements of this alternative are:

1. No or minor changes in existing allotment boundaries (MAP 8-2). Any changes made are to allow establishment of grazing systems.
2. Vegetation manipulation on 85,500 acres: 21,000 acres to be plowed and seeded; 31,000 acres to be chemically treated; 33,500 acres to be burned.
3. Development of 225 water sources and construction of 140 miles of fence, including 30 miles of fencing on sensitive habitats.
4. Wild horses and burros will be removed from Sub-Unit 1 and 4A and reduced to 1971 levels in all other areas.
5. During the first year of implementation livestock stocking rates will be determined as for the Proposed Action. Livestock will not be allocated forage from rest pastures this first year. Since there will be an initial vegetative vigor and production response in the rest pasture the first year as well as additional forage being made available to livestock through development of additional water sources, the stocking rates during the second and subsequent years is based on the production of the entire allotment. If the increased vegetative production resulting from carryover forage and water development is not adequate to support livestock for the prescribed time, livestock would be allowed to graze the rest pasture to prevent target utilization levels from being exceeded (TABLES 8-33 through 8-36). This provision would be in effect for 1 cycle on the 3 and 4 pasture grazing systems (3 or 4 years) and 2 cycles on the 2 pasture grazing systems (4 years).

Proposed seeding projects (21,000 acres) would be developed prior to initiation of grazing management systems with the production included in the calculation of stocking rates for the first year.

During the initial 3 or 4 year period, proposed burning and spray projects would be initiated throughout the study area. The increased production from these projects would become available to livestock grazing following the initial 3 or 4 year phase-in period.

6. Wildlife would be managed at reasonable numbers as defined in Chapter 1.



COWHEAD/MASSACRE
STUDY AREA
GRAZING ENVIRONMENTAL STUDY
SUB-UNIT AND MANAGEMENT
AREA BOUNDARIES
FOR ALTERNATIVE 7

TABLE 8-33
Proposed Management
Alternative 7

Sub-Unit 1: High Rock
(89,000 acres)

No grazing in Canyon bottom.

Grazing Proposal	-	Cancel all cattle grazing.																								
	-	Graze sheep only on the west side of High Rock Canyon.																								
Season of Use	-	04/01-12/07																								
Key Vegetation	-	Bluebunch wheatgrass-Idaho fescue																								
Forage Utilization Limit	-	Moderate																								
Grazing Formula	-	<table><tr><td>4/1</td><td>6/15</td><td>10/8</td><td>12/7</td></tr><tr><td>/ / / / /</td><td></td><td></td><td></td></tr><tr><td>/ / / / /</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td>/ / / / /</td><td>/ /</td></tr><tr><td></td><td></td><td>/ / / / /</td><td>/ /</td></tr><tr><td></td><td></td><td></td><td>Rest</td></tr></table>	4/1	6/15	10/8	12/7	/ / / / /				/ / / / /						/ / / / /	/ /			/ / / / /	/ /				Rest
4/1	6/15	10/8	12/7																							
/ / / / /																										
/ / / / /																										
		/ / / / /	/ /																							
		/ / / / /	/ /																							
			Rest																							
No. of Water Facilities to be Developed	-	Minimum water development consistent with wilderness values.																								
Miles of Fence to be Added or Removed	-	None																								
Livestock Use Changes	-	Sheep: 50% increase (1,800 AUMs)																								
	-	Cattle: 100% reduction (0 AUMs)																								
	-	(64% reduction overall)																								
Land Treatment	-	None																								

* Prior to full implementation (1983) livestock will be grazed at moderate use (5,000).

TABLE 8-34
Proposed Management
Sub-Unit 2: Massacre Mountain/Nut Mountain

Proposed Action Component	Management Area D (8,000 acres)	Board Corral, Wall Canyon, N. Nut Mountain Allotments (90,000 acres)	S. Portion Nut Mtn., N. Portion Massacre Mtn. Allotment (122,000 acres)	Massacre Lake and Sagehen Allotments (48,000 acres)
Grazing Proposal	Grazing would be eliminated.	3 pasture rest-rotation	4 pasture rest-rotation	3 pasture rest-rotation
Season of Use	None	May 1 - October 15	May 1 - October 15	May 15 - October 15 native range April 15 - May 15 seedings
Key Species of Vegetation	None	Bluebunch wheatgrass Bitterbrush	Bluebunch wheatgrass Bitterbrush	Idaho fescue Thurber's needlegrass
Forage Utilization Limit (key species)	N/A	Moderate	Moderate	Moderate
Grazing Formula to be Applied	None	05/01 10/15 ///////// ///////// ///////// Rest	05/01 06/15 08/01 10/15 ///////// ///////// ///////// Rest	Native Range: 05/15 10/15 ///////// ///////// ///////// Rest Seedings: Alternate years growing season rest
Number of Water Facilities to be Developed	None	8 springs 12 reservoirs 4 wells	15 springs 15 reservoirs 8 wells	5 springs 5 reservoirs 1 well
Miles of Fence to be Added (+) or Removed (-)	+8 (exclusion fence)	+15 (pasture division fence) + 5 (sensitive habitats)	+3 (sensitive habitats)	+10 (pasture division fence)
Livestock Use Changes	100% reduction	1st Yr.: 34% reduction Phase-In: 7% reduction Following Yrs: 28% increase	1st Yr.: 13% reduction Phase-In: 10% increase Following Yrs: 30% increase	1st Yr.: 16% reduction Phase-In: 17% increase Following Yrs: 17% increase
Stocking Level Prior to Full Implementation	-	5,043	8,355	3,214
Land Treatments	N/A	6,000 acres: spray 5,000 acres: burn	5,000 acres: spray 5,000 acres: burn	Respray existing seeding and spray projects (10,000 acres).
Implementation Schedule	None	Project development 1981 & 1982. Start grazing system 1983.	Project development 1981 & 1982. Start grazing system 1983.	Project development 1981 & 1982. Start grazing system 1983.

NOTE: Herding of livestock will be used in place of fencing. Prior to full implementation (1983) livestock grazing will occur at moderate use.

TABLE 8-35
Proposed Management
Sub-Unit 3: Long Valley/Sand Creek

Proposed Action Component	Management Area 3A (141,000 acres)	Management Area 3B (159,000 acres)
Grazing Proposal	2 pasture rest-rotation	2 pasture deferred rotation
Season of Use	May 1 - October 15 native range April 15 - May 15 seedings	May 1 - October 31 native range April 15 - May 1 seedings
Key Species of Vegetation	Bitterbrush Bluebunch wheatgrass	Basin wildrye
Forage Utilization Limit (key species)	Moderate	Moderate
Grazing Formula to be Applied	<p>Native Range:</p> <p>05/01 10/15</p> <p>////////////////////</p> <p>////////////////////</p> <p>Rest</p> <p>Seedings:</p> <p>Alternate years growing season rest.</p>	<p>Native Range:</p> <p>05/01 08/15 10/31</p> <p>////////////////////</p> <p>////////////////////</p> <p>////////////////////</p> <p>Seedings:</p> <p>Alternate years growing season rest.</p>
Number of Water Facilities to be Developed	12 springs 12 reservoirs 8 wells	12 springs 12 reservoirs 12 wells
Miles of Fence to be Added (+) or Removed (-)	+15 (pasture division fence) + 10 (meadow and streams)	+25 (pasture division fence) + 3 (sensitive habitats)
Livestock Use Changes	1st Yr.: 18% decrease Phase-In: 15% increase Following Yrs: 32% increase	1st Yr. and Phase-In: 17% increase Following Years: 38% increase
Stocking Levels Prior to Full Implementation (1983)	3,881	5,298
Land Treatments	10,000 acres: plow & seed 2,500 acres: spray 2,500 acres: burn	11,000 acres: plow & seed 2,000 acres: respray 2,500 acres: new spray 5,000 acres: burn
Implementation Schedule	Project development 1981 & 1982. Start grazing system 1983.	Project development 1981 & 1982 Start grazing system 1983.
Note:	Prior to full implementation (1983) livestock grazing will occur at moderate use.	

TABLE 8-36
Proposed Management
Sub-Unit 4: Mosquito

Proposed Action Component	Management Area 4A (50,000 acres)	East & Nevada Cowhead Allotments (56,000 acres)	Crooks Lake, Upper Portion S. Larkspur & Boggs Allotments (69,000 acres)	Little Valley Holy, Mosquito, & Nevada Cole- man Allotments (88,000 acres)
Grazing Proposal	Custodial management	2 pasture rest- rotation	3 pasture deferred rotation	3 pasture rest- rotation
Season of Use	May 15-Sept. 30	April 15-July 15	Native Range: May 1-Oct. 15 Seedings: April 1-May 1	May 1-Oct. 31
Key Species of	Bluebunch wheatgrass Idaho fescue Bitterbrush	Idaho fescue	Bluebunch wheatgrass Idaho fescue	Idaho fescue Bitterbrush
Forage Utiliza- tion Limit (key species)	Moderate (41-60%)	Moderate	Moderate	Moderate
Grazing Formula to be Applied	To be developed by the livestock operator.	4/15 7/15 ///////// ///////// ///////// Rest	Native Range: 05/01 10/15 ///////// ///////// ///////// ///////// ///////// ///////// ///////// Rest Seedings: Alternate years growing season rest.	5/01 10/31 ///////// ///////// ///////// ///////// ///////// ///////// Rest
Number of Water Facilities to be developed	6 springs	10 springs 10 reservoirs 6 wells	10 springs 6 reservoirs 6 wells	10 springs 10 reservoirs 10 wells
Miles of Fence to be Added (+) or Removed (-)	+3 (meadows, aspen & white fir)	+10 (pasture divi- sion fence) + 3 (sensitive habitats)	+15 (pasture divi- sion fence) + 3 (sensitive habitats)	+20 (pasture divi- sion fence) + 3 (sensitive habitats)
Livestock Use Changes	No change	1st Yr: 52% decrease Phase-In: 4% reduc. Following Years: 34% reduc.	1st Yr: 18% increase Phase-In: 15% increase Following Years: 51% increase	1st Yr: 26% reduction Phase-in: 4% increase Following Years: 41% increase
Stocking Levels Prior to Full Implementation (1983)	2,121	3,305	4,779	6,753
Land Treatments	N/A	None	3,000 acres respray 2,000 seeding	8,000 acres respray 10,000 acres burn
Implementation Schedule	Develop waters 1981 Fence sensitive areas 1981 Issue 10-Year permits 1982	Project development 1981 & 1982 Start grazing system 1983	Project development 1981 & 1982 Start grazing system 1983	Project development 1981 & 1982 Start grazing system 1983

NOTE: Prior to full implementation (1983) livestock grazing will occur at moderate use.

Grazing would be managed as shown on TABLES 8-33 to 8-36. The forage consumption summary for this alternative is shown on TABLE 8-37. Total estimated cost for range facilities is \$2,405,000.

Although this alternative seeks to maintain existing allotment boundaries or modified allotment boundaries in most cases, the various elements of the alternative and accompanying impacts are organized by sub-units defined in the Proposed Action in order to retain uniformity and consistency in quantification of impacts.

Impacts

Soils

Erosion rates for this alternative are in most cases the same or minimally higher than erosion rates for the Proposed Action. For Sub-Unit 1 and Sub-Unit 2, erosion rates for this alternative would be about .1 tons per acre per year above projected rates under the Proposed Action (.6 tons per acre per year). Erosion rates for this alternative and the Proposed Action in Sub-Units 3 and 4 would be comparable, ranging from .6 to .7 tons per acre per year.

Soil impacts from land treatments would be as described for the previous alternatives.

Water

Generally, water quality improvements through the study area would be similar to the Proposed Action. Impacts to water quality from land use treatments would be as described for the other alternatives.

Vegetation

Vegetative Condition and Trend: Vegetation improvement will occur on most of the study area. The acres in poor condition will decrease from 403,000 to 122,000, the acres in fair condition will decrease from 437,000 to 314,000, the acres in good condition will increase from 6,000 to 360,261, and the acres in excellent condition will increase from 0 to 400 (TABLE 8-38). The most significant improvement will occur on areas grazed under three and four treatment systems, fall grazing, or grazing exclusion areas. The grazing systems on these areas provide two growing season's rest following use during the spring. As was discussed in Chapter 3, this degree of rest is necessary for vegetation improvement and will allow the condition class of ecological sites to improve. Less vegetative improvement will occur on areas grazed under two treatment grazing systems. These grazing systems do not provide adequate rest to completely recover from grazing (see page 3-9). Therefore, only those ecological sites with high recovery potentials will improve. Improvement is not anticipated near water or other concentration areas where utilization levels are invariably high. The condition of ecological sites under the various management proposals is shown on TABLE 8-39.

TABLE 8-37
FORAGE CONSUMPTION SUMMARY (AUMS)

SUB-UNIT/AREA	Livestock 1st Year	Livestock Years 2-4	Livestock Year 5	Wild Horses	Deer*	Antelope*	Bighorn Sheep	Total
Sub-Unit 1	1,800	1,800	1,800	0	268	1,307	120	3,495
Sub-Unit 2								
Board Corral, Wall Canyon, N. Nut Mountain Allotments	4,114	5,805	8,005	1,062	385	326	-	9,778
Massacre Mtn. & S. Nut Mountain Allotment	8,723	11,029	13,029	234	947	329	-	14,539
Massacre Lake and Sagehen Allotment	2,700	3,760	4,760	612	165	218	-	5,755
Mgt. Area D - Archaeo- logical Area	0	0	0	0	0	0	0	0
SUB-UNIT TOTAL	15,537	20,594	25,794	1,908	1,533	853	0	30,088
Sub-Unit 3								
Management Area A	4,770	6,691	7,691	180	360	283	-	8,514
Management Area B	9,266	9,266	10,966	0	93	58	0	11,117
SUB-UNIT TOTAL	14,036	15,957	18,657	180	453	341	0	19,631
Sub-Unit 4								
Management Area A	2,121	2,121	2,121	0	1,543	0	-	3,664
East & Nevada Cowhead	1,624	3,247	2,230	0	535	290	-	3,055
Cooks Lake & Upper Portion of Boggs & S. Larkspur	4,984	6,561	8,261	414	247	261	-	8,118
Nevada Coleman, Little Valley, Holy, & Mosquito	5,522	7,773	10,573	0	453	297	-	11,323
SUB-UNIT TOTAL	14,251	19,702	23,185	414	2,770	848	0	27,225
STUDY AREA TOTAL	45,624	58,053	69,436	2,502	4,996	3,369	120	80,423

* Represents actual quantity of livestock AUMs allocated for big game use. Due to dietary differences the quality of forage for big game may be the limiting factor on populations. Actual use may therefore be less than allocated.

TABLE 8-38

Range Condition in 20 Years with Alternative 7
(Acreage by Condition Class)

	Poor (Acres)	Fair (Acres)	Good (Acres)	Excellent (Acres)	Miscellaneous
Sub-Unit 1					
High Rock	1,400	16,940	58,810	370	11,500
Sub-Unit 2					
Area D	1,723	2,344	935	0	1,793
Board Corral, Wall Canyon, N. Nut Mtn. Massacre Mtn. & S. Nut Mtn.	0 906	38,525 32,734	55,136 87,975	0 0	2,500 5,500
Massacre Lake & Sagehen	3,303	18,759	25,555	0	300
Sub-Unit 3					
Area A	20,369	74,279	18,043	0	33,530
Area B	40,266	80,359	13,632	0	19,687
Sub-Unit 4					
Area A	Unknown	Unknown	Unknown	Unknown	3,030
East and Nevada Cowhead Crooks Lake, Upper Boggs, & S. Larkspur Little Valley, Holy, Mosquito, Nevada Coleman	4,835 3,344 0	18,952 21,371 26,359	30,458 62,120 63,694	0 0 0	1,200 6,775 5,133
Study Area Total	76,146	330,622	416,358	370	90,948

TABLE 8-39
VEGETATION CONDITION IN 20 YEARS WITH ALTERNATIVE 7

Ecological Site	Present Condition	East Side of High Rock Canyon Area		Area 44	All Other Areas
		2D, and Grazing	Exclusion Areas		
1. Shadscale/Indian ricegrass	Poor	Poor	Poor	Unknown	Poor
2. Greasewood/Basin wildrye	Poor	Poor	Poor	Unknown	70% Poor, 30% Fair
3. Greasewood-Rabbitbrush/Basin wildrye	Poor	Poor	Poor	Unknown	70% Poor, 30% Fair
4. Low Sage/Sandberg bluegrass	Fair	Good	Good	Unknown	15% Fair, 85% Good
5. Low Sage/Bluebunch wheatgrass	Fair	Good	Good	Unknown	15% Fair, 85% Good
6. Low Sage/Idaho fescue	Fair	Good	Good	Unknown	15% Fair, 85% Good
7. Juniper-Low Sage/Idaho fescue	Poor	Fair	Fair	Unknown	Fair
8. Big Sage/Bluebunch wheatgrass-Indian ricegrass	Fair	Fair	Fair	Unknown	Fair
9. Big Sage/Bluebunch wheatgrass	Poor	Fair	Fair	Unknown	Fair
10. Big Sage/Idaho fescue	Fair	Good	Good	Unknown	20% Poor, 65% Fair, 15% Good
11. Big Sage/Basin wildrye	Poor	Poor	Poor	Unknown	50% Poor, 50% Fair
12. Juniper-Big Sage/Bluebunch wheatgrass	Fair	Good	Good	Unknown	Good
13. Bitterbrush/Idaho fescue	Poor	Good	Good	Unknown	Good
14. Mountain Mahogany/Western	Fair	Good	Good	Unknown	Good
15. Silver Sage/Mat muhly	Poor	Fair	Fair	Unknown	Fair
16. Baltic Rush	Fair	Good	Good	Unknown	40% Fair, 60% Good
17. Aspen/Slender wheatgrass	Poor	Good	Good	Unknown	40% Fair, 60% Good
18. Tufted Hairgrass-bluegrass	Poor	Excellent	Excellent	Unknown	40% Fair, 60% Good
19. Willow/Tufted Hairgrass-	Poor	Excellent	Excellent	Unknown	40% Fair, 60% Good

Changing the procedures for calculating stocking rates may result in pastures being grazed during the phase-in period (3 or 4 years). During the second year, livestock would be allocated forage from rested pastures. On areas that have a significant portion of the area rested annually, it is not expected that there will be sufficient vegetative improvement during the first year to allow livestock use to be increased without using rest pastures. Since there will be some improvement in vegetative vigor, a certain amount of carry over forage from the rested pastures and, some increased forage production from additional water developments, use in the rest pastures is not possible to predict. The greater the area rested, and the greater the increase in allowable livestock use the second year, the greater the chance of having to use rest pastures. Therefore, two pasture grazing systems in which 50 percent of the area is scheduled for rest would be more likely to require modification of the grazing system than a four pasture grazing system in which 25 percent of the area is rested.

Although rest pastures may be used during the phase-in cycle, vegetative improvement will occur but at reduced rates. Vegetation in pastures which are not grazed until after seedripeness will receive the benefits of growing season rest and vigor will improve. Sufficient improvement is anticipated on all areas, except the East and Nevada Cowhead Allotments, to allow the grazing system to be followed as designed by the end of the phase-in cycle. The East and Nevada Cowhead Allotments are scheduled for a two pasture rest-rotation system with all livestock use occurring prior to seedripeness. Because of the high percentage of the area rested (50 percent) the rest pasture will probably be used during the phase-in period resulting in growing season use of both pastures.

Construction of fences and water developments will result in impacts similar to those discussed in Chapter 3. Approximately 550 acres of vegetation will be disturbed during construction.

Eliminating wild horses in Sub-Unit 1 and Management Area 4A and reducing horses to 1971 levels in remaining areas will reduce consumption of forage by wild horses from 11,530 AUMs to 2,500 AUMs. This will effectively reduce the adverse impacts of season long grazing within wild horse areas. The benefits of rest provided by livestock grazing systems will be realized on a larger area since the areas and intensity of wild horse use will be reduced.

Land treatment projects would have impacts similar to those discussed previously.

Vegetative Production: Production will increase significantly due to implementation of grazing systems and land treatment projects. Initial forage increases as a result of later turnout dates, deferment and rest will be similar to those discussed for the proposed action. These actions will cause initial forage production to increase from 55,000 AUMs to 65,000 AUMs. Seeding 21,000 acres in Sub-Unit 3 will add an

additional 5,250 initial AUMs (TABLE 8-40). Burning and spraying projects initiated by the 5th year will increase forage production at a rate of 5 acres per AUM for new treatments and 10 acres per AUM for respraying existing treatments. Production will increase by approximately 13,000 AUMs as a result of these projects (TABLE 8-40).

As vegetative conditions improve, livestock forage production will increase. By using Anderson's (1978) stocking rate guides for ecological sites in improved condition classes, the production in 20 years is estimated to be 150,000 AUMs (TABLE 8-40). Forage production is expected to increase sufficiently during the phase-in period, with the exception of the East and Nevada Cowhead Allotments, to allow the grazing systems to be followed as designed by the 5th year. On the East and Nevada Cowhead areas, forage production of the use pasture is expected to increase by only 25 percent during the phase-in period. This will limit livestock use the 5th year (TABLE 8-37) since a 100 percent increase would be necessary to allow full livestock numbers on a 2 pasture rest system.

Threatened and Endangered Plants: Impacts would be similar to those discussed for the proposed action. If species occur, they would be benefited by reduced utilization levels and improved range conditions.

Livestock Grazing

Impacts of this alternative will be beneficial to livestock grazing. Proposed livestock use levels are substantially higher on most areas than in other alternatives as a result of land treatment projects and the modified method for determining stocking rates. An exception is the High Rock Sub-Unit which undergoes a 64 percent reduction in overall grazing use.

On the two and three pasture rest-rotation grazing systems there is a possibility that the proposed level of use will exceed the moderate use limits the second year, thereby requiring downward adjustments in livestock use the third year of implementation. Because of the unpredictable amount of vigor recovery during the first year and the amount of carry over forage from rest pastures it is not possible to predict at this time the precise level of livestock use which would be allowed.

Turnout dates on most areas without seedings are approximately two weeks later than is presently occurring. Livestock operators will be required to provide additional spring forage on base ranches to carry livestock during this period. Operators within the Sagehen/Massacre Lake area of Sub-Unit 2, Sub-Unit 3, and the East, Nevada Cowhead, and Crooks Lake Allotments within Sub-Unit 4 would turnout on existing dates.

Development of additional livestock water and providing more forage through spraying, burning, and seeding projects will benefit livestock performance and increase livestock weights.

TABLE 8-40

LIVESTOCK FORAGE PRODUCTION

<u>Area</u>	<u>Initial AUMs</u>	<u>AUMs After Spraying and Burning</u>	<u>AUMs in 20 Years</u>
<u>Sub-Unit 1</u>	6,120	6,120	13,097
<u>Sub-Unit 2</u>			
Area D	428	428	997
Board Corral, Wall Canyon, N. Nut Mountain	6,274	8,474	17,755
Massacre Mtn. & S. Nut Mtn.	9,891	11,891	26,233
Massacre Lk. & Sagehen	4,059	5,059	10,376
<u>Sub-Unit 3</u>			
Area A	7,254 ^{1/}	8,254	11,677
Area B	9,266 ^{2/}	10,966	17,482
<u>Sub-Unit 4</u>			
Area A	2,121	2,121	2,121
East & Nevada Cowhead	3,245	3,245	5,707
Crooks Lake, Upper Boggs, and South Larkspur	7,007	8,707	19,658
Mosquito, Nevada Coleman	8,401	11,201	25,314
STUDY AREA TOTAL	64,066	76,466	150,417

^{1/} Includes 2,500 AUMs from seedings.

^{2/} Includes 2,750 AUMs from seedings.

Limiting livestock use to moderate use levels will also improve livestock performance on areas presently receiving heavy use. The Arizona Inter-Agency Range Committee (1972, 1973) reported that by reducing grazing pressure from close grazing (70-80 percent utilization) to moderate grazing (40-50 percent utilization) yearling heifer weights increased by 8 percent, the percent calf crop increased 11 percent, calf weaning weights increased 10 percent, average cull cow weights increased 20 percent, and average cull bull weights increased 17 percent. It is anticipated that improvement in livestock performance on the study area will be somewhat less than this study since the average difference between present utilization levels and moderate use levels is not as great within the Cowhead/Massacre area.

Implementation of grazing systems will have similar impacts to those described for the proposed action in Chapter 3. Additional livestock herding and movement between pastures will be required. An additional rangerider would be required in the Massacre Mountain and South Nut Mountain portion of Sub-Unit 2 since herding would be used in place of fencing to implement the grazing system. Implementation of this system would require combining livestock from two different herds (Weber's and Earp's) and would result in increased sorting and handling costs during the grazing season. Also, it may not be possible for the Weber operation to continue their practice of fall calving and weaning calves from cows during July or August if they are combined with Earp's livestock.

During the first one or two years livestock performance will decrease as cattle become accustomed to new grazing patterns. After this initial period, livestock performance will improve as a result of improved forage quality and quantity and additional livestock water.

Wildlife

As with Alternative 6, overall deer numbers would show a moderate increase slightly exceeding reasonable numbers. Antelope numbers, will show a 50-100 percent increase. Quail habitat will improve slightly. Sage grouse habitat will show a moderate improvement and numbers of sage grouse will increase slightly. Nongame species will show a slight to great improvement depending on the site. Food supply for raptors should increase slightly. Continued deterioration will occur on most fisheries.

Impacts from land treatments (plow and seed, spray and burn) will be as described for the Proposed Action and other alternatives.

Wild Horses

Impacts will generally be favorable to horses which remain within the study area. Following implementation, horse numbers will be as shown in TABLE 8-41.

TABLE 8-41
WILD HORSES AND BURROS

	<u>Existing</u>	<u>Proposed</u>
Sub-Unit 1	279	0
Sub-Unit 2	368	106
Sub-Unit 3	31	10
Sub-Unit 4	<u>29</u>	<u>23</u>
TOTAL	707	139

Horses that remain will benefit from increased forage availability provided by moderate use restrictions and periodic rest from livestock grazing. Although the potential for exceeding moderate use levels during the second year of implementation may slightly adversely affect forage availability, improved range conditions in Sub-Unit 2 and 4 will increase the composition and availability of grasses, the preferred dietary species. The vegetative improvement in Sub-Unit 3, although less than that anticipated in other wild horse areas, will benefit horses through increases in grass species.

The impacts of fencing and water development will be similar to, though slightly greater than described in Chapter 3.

Cultural Resources

Termination of grazing in the canyon bottoms and in the eastern half of the High Rock Sub-Unit would return substantial benefits to the approximately 1,050 archaeological sites predicted to lie in the area; livestock trampling would be eliminated, and progress through the natural successional phases would rapidly approach the pristine (pre-grazing) landscape. All National Register quality sites, including the Lassen/Applegate Trail corridor, would benefit.

A 50 percent increase in sheep use of the western half of High Rock would perpetuate adverse impacts on the approximately 900 sites which are believed to lie within the area of effect. National Register properties in this area would continue to risk compromise of their values.

The exclusion of the archaeologically sensitive Massacre Lakes area (Management Area 2D) of the Massacre/Nut Mountain Sub-Unit from the grazing regime would protect the most significant nexus of cultural sites so far identified in the sub-unit. Approximately 150 archaeological and historic sites (including two large districts identified as probable National Register candidates) would be allowed to rest in perpetuity from the incremental deterioration wrought by annual livestock impacts, and their ecosystems would be allowed to revert to a regime of purely natural forces.

Elsewhere in the Massacre/Nut Mountain Sub-Unit, approximately 5,750 predicted archaeological and historic sites would suffer an annual disturbance (livestock uses increasing from 27-46 percent) and a continued depletion of their information content. All National Register properties within Management Areas 2A, 2B, 2C, and 2E would be subject to attrition substantially advanced over the present rate of deterioration.

Livestock use increases of 29-36 percent would pose significantly increased degradation of all of the approximately 6,200 cultural sites predicted to lie within the Long valley/Sand Creek Sub-Unit. All included National Register properties would be cast into the arena of increased adverse effects.

In the Mosquito Sub-Unit, the alternative proposal for Management Area 4A, identical with that identified in the proposed action, would pose those impacts on cultural resources identified in Chapter 3, save that the Nevada Cowhead Allotment (approximately 44,000 acres, containing approximately 900 cultural sites) would be included in the area experiencing no change in livestock use. Approximately 350 cultural sites would be affected by livestock increases. Management Areas 4B and 4C (containing a projected 5,100 cultural sites) would receive increased livestock pressures (livestock usage would increase from 28-51 percent). All National Register quality properties would be forfeited.

Recreation

Recreational use of the study area would not be significantly impacted by this alternative. Small incremental gains in scenic and hunting quality should occur once stocking rates are established and range improvement begins.

Removal of cattle from the High Rock Canyon area will reduce the present impact of livestock on this popular natural primitive recreational use area. However, continued sheep use of this area will not provide recreational visitors the full opportunity to experience this area's naturalness as offered under the proposed action.

During the monitoring phase of this alternative grazing impacts on the area's aesthetic qualities would remain unchanged or improve slightly. Implementation of range improvement projects scheduled to follow the monitoring phase would create numerous visual contrasts with the surrounding landscape. These impacts could be mitigated through application of design criteria to each project which would reduce visual contrasts of the projects. The resultant aesthetic impacts would be similar to the impacts of Alternative 4 and have a cumulatively greater impact on the area's total aesthetic qualities.

Wilderness: Impacts on Sub-Unit 1 would be the same as for Alternative 6. Impacts within the other sub-units would be slightly less than under Alternative 5 due to retention, though in lesser numbers, of wild horse and burro populations and subsequent viewing opportunities.

Social and Economic Conditions

During the first year of implementation of Alternative 7, total AUMs granted to the Cowhead/ Massacre permittees would be reduced about 20 percent below the present level (reduced from 56,730 to 45,624 AUMs). In combination with the reduction in permitted numbers is a change in most management areas of seasons of use. However, Alternative 7 differs from the proposed action and several of the other alternatives in that turnout dates, for the most part, would not change from the present. This is due to the distribution of early-season, seeded range over most of the planning unit. What would change is the present pattern of use, where the public lands are used for early-season range. Alternative 7 proposes multi-pasture systems in which uniform numbers of livestock

could graze throughout a five or six month season. As discussed in greater detail in the sub-unit analyses, such a shift would impose increased feed costs on some of the permittees (especially those operators in Sub-Units 3 and 4).

The first year economic impacts would be more severe than the impacts encountered in subsequent years following the proposed increases in stocking levels (TABLE 8-42 compares existing use with each of the first five years of implementation of Alternative 7). Although economic hardships will be faced by most of the permittees, the one year cutback should not by itself force any of the permittees out of business.

Licensed grazing would increase in the second and subsequent years until year 5, at which time the phase-in period would be completed in all of the areas. In year 5, springtime use would have increased from the initial year's use under this alternative, but would still be eleven percent below present use (a reduction from 23,834 to about 21,318 AUMs licensed before June 15). Spring and early summer forage needs would vary from unit to unit, but approximately 2,500 AUMs of replacement spring feed would still need to be developed by the planning unit permittees.

Three of the permittees in Sub-Units 1 and 2 would face substantial operating cost increases due to the loss of early season use and reductions in the number of cattle they can turn out. It is probable that they could remain in business, however. The remainder of the permittees would face either moderate reductions or increases in allowed use. Due to the uniform livestock numbers proposed throughout the season, about 15 of the permittees would be forced to make adjustments in their management schedules to adjust to the alternative.

Due to the variability of impacts of this alternative among the different management areas, little change in the overall situation of the regional economy is predicted. Similarly, it is doubtful that any significant social changes would occur in the planning unit as a result of Alternative 7.

More detailed analyses of the impacts of Alternative 7 on the ranchers are included in the sub-unit sections. These analyses will consider the impacts upon the ranches following the phase-in period.

Impacts -- Sub-Unit 1, High Rock

Vegetation

Vegetation Condition and Trend: Vegetative response along the bottom of High Rock Canyon and on the east side of the canyon will be the same as described for the proposed action in Chapter 3. Implementation of a three treatment grazing system on the west side of the canyon will result in significant vegetative improvement. Vegetative response would be similar to the three treatment grazing systems described in Chapter

TABLE 8-42
PRESENT AND PROPOSED USE UNDER ALTERNATIVE BY OPERATOR

Operator	Present Use (AUMs)	Use During Year "X" of Implementation (AUMs)				
		1	2	3	4	5
Berryessa	2,178	1,785	2,504	2,878	2,878	2,878
Bordwell	1,040	1,011	1,241	1,241	1,489	1,489
Bunyard	3,248	3,446	3,725	2,725	2,865	4,014
L & L Cattle Co.	3,133	2,608	3,605	3,605	4,857	4,881
Carey, F. & J.	121	44	87	87	87	60
Carey, P. & J.	154	55	111	111	111	76
Cockrell's	177	63	126	126	126	89
Coops	1,702	1,086	1,534	1,534	2,115	2,115
Earp	8,283	4,345	5,317	5,317	5,317	6,282
Hill	722	4,120	592	592	816	816
Fee	3,371	2,815	3,834	3,834	4,932	4,932
Hapgood	496	579	579	579	579	685
Harris	895	870	1,068	1,068	1,282	1,282
Heryford	1,100	787	1,109	1,157	1,455	1,455
Hill, Norene	2,004	2,336	2,336	2,336	2,336	2,764
Hussa	1,838	1,250	1,764	1,764	2,433	2,433
Jones	392	412	454	476	476	532
Kirkpatrick	2,433	2,758	2,833	2,872	2,872	3,344
Kyte	1,111	755	1,067	1,067	1,451	1,451
Laxague	1,104	922	1,274	1,421	1,421	1,475
Marx	1,588	1,343	1,858	1,858	1,858	2,352
Page	352	362	407	431	431	477
Parman, J.	1,364	946	1,329	1,439	1,664	1,664
Parman, R.	128	105	147	169	169	169
Peterson	369	357	378	378	378	397
Quirk	560	653	653	653	653	773
Schadler, G.	57	57	57	57	57	57
Schadler Ranch	6,315	4,448	6,166	6,166	7,450	7,025
Smith	166	193	193	193	193	229
Steward	560	517	646	713	713	749
Warren's Ranch	1,548	1,510	1,793	1,940	1,940	2,088
Weber	7,076	6,229	8,106	8,106	8,309	9,843
Wolfsens's	1,145	779	1,099	1,099	1,495	1,495
TOTAL	56,730	45,624	58,053	59,053	65,753	69,436
Percentage Change from Existing Use	-	-20%	+2%	+4%	+16%	+22%

3. Grazing until December 7 will result in concentrated use on bitterbrush since grasses and forbs will have matured and lost much of their nutritional value. The acreage affected, however, is small (less than 1 percent of the sub-unit) and the rest received during the two following years is expected to allow vegetative improvement. Studies on adjacent areas indicate little use of bitterbrush by sheep during the spring months (USDI, BLM, 1977).

Grazing by sheep has an added benefit in that they can be herded to prevent concentration areas near water. The vegetative condition in 20 years is shown on TABLES 8-38 and 8-39.

Vegetative Production: Implementation will result in initial forage increases as a result of rest and deferment as previously described in Chapter 3. The East side of High Rock Canyon and pastures deferred until seedripe or completely rested will experience an initial 28 percent increase in forage. Turnout on April 1 will not provide any additional forage production on the early use pasture.

Improvement in range condition over a 20 year period will allow forage production to increase to approximately 13,000 AUMs (TABLE 8-40).

Wildlife

Deer: Elimination of cattle from the sub-unit would benefit deer by eliminating competition for forage. Continuous sheep grazing on the west side of the sub-unit would allow some competition to continue, though at a greatly reduced rate from what now occurs. The proposed grazing system would have sheep use in the spring during one out of three years and fall sheep use one out of three years. Habitat response over the whole sub-unit would be expected to support a population increase from 100 to at least 130 and probably more.

Antelope: Antelope would be similarly impacted by the expected improvement in habitat. The habitat would be expected to support a potential population of at least 900 antelope (double existing numbers).

Bighorn Sheep: Retention of domestic sheep grazing in High Rock Canyon would eliminate the potential for reintroduction of bighorn sheep into the area. Although forage may still be allocated, the possibility of disease transmission would preclude any transplant attempts.

Nongame Species: Termination of grazing on half the area would reduce vegetation removal. This will lead to better vegetative layering and cover for some nongame species. Improvement would be most evident in the riparian habitat along the canyon bottom. Small mammal species richness would be expected to decrease on mesic areas, while bird would show a slight increase in numbers of species. However, animal densities are likely to increase. These changes would be more evident and would occur earlier on the east side of the canyon. Similar changes would occur on the west side, but the degree and rate of change would be slower.

Raptors: The raptor population in Sub-Unit 1 is not expected to change as a result of this alternative because suitable nest sites are the apparent limiting factor. However, productivity is expected to increase as a result of increased prey base.

Wilderness

Impacts would be greater on the west side of High Rock Canyon than under Alternative 6 due to 50 percent increase in sheep grazing. The east side of High Rock Canyon would have the same impacts as under the proposed action.

Social and Economic Conditions

The combination of proposed livestock use throughout the planning unit will moderate the cancellation of cattle grazing in Sub-Unit 1 for Earp and will result in increased privileges for Bunyard.

Bunyard's sheep operation will remain unchanged from the present under Alternative 7. His allowed cattle use would increase from about 950 AUMs to 1,915 AUMs. This increase could either be used to support a larger herd, to reduce his hay needs, or for leasing to other area ranchers.

Earp would be faced with a 24 percent reduction in permitted use (from 8,283 to 6,282 AUMs). Hay costs to compensate for the early season loss (April 1 to May 1) could add about \$24,000 to Earp's annual operating costs. The season-long reduction of 220 head could force Earp to reduce his herd by about 90 head, thus reducing his gross income from livestock sales by about \$15,000. Retaining his present herd size by putting in irrigated pasture would add about \$16,000 in operating and interest costs to Earp's annual expenses. Alternative 7 would force some expensive management changes in Earp's planning unit operations.

Impacts -- Sub-Unit 2, Massacre/Nut Mountain

Vegetation

Board Corral, Wall Canyon, and North Nut Mountain Allotments:

Vegetation Condition and Trend: Vegetative impacts will be similar to those discussed for the three treatment grazing system in the proposed action. Vegetative improvement is anticipated on most sites. It is anticipated that rest pastures will be used during the phase-in period but this is not expected to significantly alter long term range improvement.

Grazing until October 15 in place of September 30, as in the proposed action, will result in a slight increase in use of bitterbrush and other browse species. However, using bitterbrush as a key species would prevent heavy use on most areas and overall vegetative response on this site would improve as described in Chapter 3. Bitterbrush near livestock concentration areas would not be expected to respond because of inadequate rest provided by the grazing system.

Spraying and burning 11,000 acres will have similar impacts as previously described in Alternative 4. Differences exist only in the acreage treated. These vegetative treatments will hasten range improvement and provide additional livestock forage.

The vegetative condition in 20 years is shown on TABLES 8-38 and 8-39.

Vegetative Production: Implementation of grazing systems will provide forage increases as previously discussed in Chapter 3. Delaying turnout until May 1 will provide approximately 17 percent additional forage in the early use pasture (Hormay, 1970). Pastures rested or deferred until seedripeness will experience an initial 28 percent increase in forage (Hormay, 1970).

Spraying and burning 11,000 acres will increase livestock forage production by approximately 2,200 AUMs. As range conditions improve, the estimated forage production is expected to increase to 18,000 AUMs (TABLE 8-40).

South Nut Mountain and Massacre Mountain Allotments:

Vegetation Condition and Trend: Vegetative improvement is anticipated on most sites. Impacts will be similar to those described for the four treatment grazing system on Area 4C of Alternative 6. Minor differences exist in the stocking rate and season of use. There is a chance that rest pastures may be grazed during the phase-in period. However, there will be vegetative improvement during the first year and there may be sufficient carry over forage from the previous years rest pastures so that rest pastures may not be grazed. Modification of the grazing system during the phase-in period is not expected to effect long term range conditions.

Grazing until October 15 in place of September 30 will result in increased use of browse species. Keying to bitterbrush would prevent overuse, and vegetative improvement in 20 years would not be significantly altered.

Spraying and burning 10,000 acres will have impacts similar to those described in Alternative 4. Range improvement will be hastened and an additional 2,000 AUMs of livestock forage will be provided.

The vegetative condition in 20 years is shown on TABLES 8-38 and 8-39.

Vegetative Production: Impacts of implementing grazing systems will be as discussed in Chapter 3. Initial forage is expected to increase from 8,000 to 10,000 AUMs as a result of deferment and rest. Spraying and burning will provide an additional 2,000 AUMs of forage. As range conditions improve, livestock forage production in 20 years will increase to 26,000 AUMs (TABLE 8-40).

Massacre Lake and Sagehen Allotments:

Vegetative Condition and Trend: Impacts will be similar to those described for the Board Corral, Wall Canyon, and North Nut Mountain portion of this sub-unit. Not using bitterbrush as a key species could result in

heavy use by livestock in the B treatment pasture since grazing would extend until October 15 and livestock concentrate on browse species in the fall. The bitterbrush/Idaho fescue site, however, occupies only 3 percent of this area.

Spraying and burning 11,000 acres will have impacts similar to those described for these land treatments in Alternative 4. These projects will hasten range improvement. The vegetative condition in 20 years is shown on TABLES 8-38 and 8-39.

Vegetative Production: Impacts of implementing grazing systems will be as described in Chapter 3. Initial forage production is expected to increase from 3,000 to 4,000 AUMs as a result of deferment and rest. Spraying and burning will provide an additional 1,000 AUMs of forage. As range conditions improve, livestock forage production in 20 years will increase to 10,000 AUMs (TABLE 8-40).

Management Area D: Impacts would be the same as described for the proposed action in Chapter 3.

Wildlife

Board Corral, Wall Canyon, North Nut Mountain:

Deer: Limiting grazing to moderate use and keying utilization to bitterbrush would ensure a 15 percent increase in deer forage availability. Resting the area every third year would provide for only partial recovery of bitterbrush which would yield slightly increased vigor and slightly improved condition. However, approximately 10 percent of the management area would be treated by spraying or burning. The Vale BLM District found that deer use of seedings was nearly nonexistent except when heavy snows forced use and that spraying reduced deer use on summer range. A 5-10 percent increase in deer numbers (170-187) would be expected.

Antelope: Impacts on antelope would be similar. Increased bitterbrush forage during summer and rest years will remove one of two major sources of competition between antelope and cattle. Spring competition for forbs will still occur one out of three years. Antelope may show a 50 percent population increase to 225.

Sage Grouse: Nest disturbance and removal of spring and early summer forage plants would be reduced 66 percent and would result in a beneficial impact.

There would be a substantial reduction in potential productivity due to habitat loss through land treatments on 10 percent of the management area. A net moderate decrease in productivity is expected due to the increased productivity of birds on the improved native range.

Nongame Species: Habitat structure for nongame birds and small mammals would improve as a result of the increase in residual vegetation on native ranges. The density of most nongame species will increase accordingly while species richness remains essentially unchanged. Population densities will be even higher during rest years. Land treatment would reduce nongame wildlife abundance and alter species composition on 11,000 acres in the same manner as described in Alternative 5, Management Area 2C.

Massacre Lake and Sagehen:

Deer: Impacts from the grazing system would be very similar to those described for the Board Corral, Wall Canyon, and North Nut Mountain Management Areas. Eitterbrush is not used as a key species in this system because it constitutes an insignificant amount of the vegetation.

Approximately 20 percent of the management areas will be treated with herbicide. Much of the treatment would be in areas previously plowed and seeded to crested wheatgrass and would effect deer insignificantly. The respray of areas would have the same effects that herbicidal treatment would have on previously unsprayed areas. The combination of positive and negative impacts would be expected to net a 5-10 percent increase in the carrying capacity of the area for deer (73-80).

Antelope: Impacts would be similar to those on antelope in the Board Corral, Wall Canyon, and North Nut Mountain Management Areas. Herbicidal treatment on 10,000 acres would reduce wintering habitat for antelope on the area. Antelope habitat would improve on native ranges but would become less desirable on treated areas. A net result of increasing the carrying capacity of the antelope habitat by 35 percent (to 150 animals) would occur.

Sage Grouse: Impacts would be similar to those described for Board Corral, Wall Canyon, and North Nut Mountain Management Areas.

Nongame Species: Impacts would be similar to those described for Board Corral, Wall Canyon, and North Nut Mountain Management Areas.

South Nut Mountain, Massacre Mountain:

Deer: Browse availability will increase by about 10 percent. Deferment and rest treatments will increase vigor of browse species and defer livestock use of browse by increasing perennial grasses. Browse competition will be eliminated on 50 percent of the area each year. At least 50 percent of the area will be free from general forage competition during fawning and nursing periods. Deer numbers are expected to show a moderate increase (375-460).

Antelope: Antelope will benefit from the increased forb densities resulting from deferred treatments, total elimination of forage competition on 25 percent of the area and near elimination of competition in the late use pasture. Antelope habitat would improve to support a potential 100 percent increase (to 22) in the antelope population of the management area.

Sage Grouse: Nest cover removal and forb competition will be eliminated during the brooding season on 50 percent of the area, and up to the peak hatching period in an additional 25 percent. Spraying and burning will remove 10,000 acres of abundant but crucial big sage habitat. The net result would be a moderate increase in sage grouse productivity and population size.

Nongame Species: Plant diversity, percent cover, and structure and food supply for most nongame species would increase. Bird use should increase dramatically and species richness will show a significant increase. Small mammal populations will show similar increases as described in Chapter 3.

Wilderness

Impacts would be as described for Alternative 5.

Social and Economic Conditions

After the initial phase-in period, permitted livestock use in Sub-Unit 2 will increase by 33 percent (from 19,341 to 25,794). Most of this increase will be of direct benefit to the nine operators using this area, since changes from current seasons of use are, with two exceptions, minor. Therefore, if commensurate feed sources can be found to winter any herd increases, up to a 1,173 head increase could be realized by these operators ($25,794 - 19,341 = 6,453$ AUMs divided by 5.5 month season = 1,173 AUs). This could increase the sales of these operators by about a third.

There will be two exceptions to the general benefits of this alternative. Due to their present early season use of the Wall Canyon Allotment before moving onto the Sheldon Range, Heryford and Hussa will be forced to develop about 421 AUMs and 527 AUMs of feed prior to June 15. These could increase their feed prices substantially if they don't adjust their operations to the new grazing systems proposed under this alternative.

Impacts -- Sub-Unit 3, Long Valley/Sand Creek

Vegetation

Management Area 3A:

Vegetative Condition and Trend: Vegetative improvement will occur on most of the more productive sites within this area. Moderate use restrictions will allow areas not immediately adjacent to water or other concentration areas to improve. The response of grass and forb species will be similar to the two pasture deferred rotation grazing systems described in Alternative 6. The response of browse species would be better than that described for the two pasture deferred system. Rest would be provided every other year and improvement would be anticipated on most sites containing bitterbrush, willow, or other browse species.

Allocating forage to livestock from the rested pasture the second year will probably result in rest pastures being grazed during the phase-in period. This will not, however, affect long term range conditions.

Excluding grazing on Sand Creek will provide for significant improvement on four miles of riparian habitat.

Plowing and seeding 10,000 acres will have similar impacts as described for the proposed action. Providing alternate years growing season rest of seeded areas will maintain the long term productivity of seedings and retard or prevent reinvasion of sagebrush (Sharp, 1970).

Spraying and burning 5,000 acres will have similar impacts to those discussed in Alternative 4.

The vegetative condition in 20 years is shown on TABLES 8-38 and 8-39.

Vegetative Production: Impacts of implementing grazing systems will be as discussed in Chapter 3. Initial forage production is expected to increase from 3,900 AUMs to 4,800 AUMs as a result of deferment and rest. Plowing and seeding 10,000 acres will provide an additional 2,500 AUMs. Spraying and burning will provide an additional 1,000 AUMs. As range conditions improve, livestock forage production in 20 years will increase to 12,000 AUMs (TABLE 8-40).

Management Area 3B:

Vegetative Condition and Trend: Vegetative impacts will be similar to those described for the two pasture deferred rotation systems in Alternative 6. The two pasture system does provide adequate rest for vigor recovery. Vegetative improvement is anticipated on approximately 80 percent of site having high recovery potential.

Plowing and seeding 11,000 acres will have similar impacts as described for the proposed action in Chapter 3. Providing alternate years growing season rest will provide for seeding maintenance and prevent or retard big sagebrush reinvasion (Sharp, 1970). Spraying and burning impacts will be similar to those discussed in Alternative 4.

The vegetative condition in 20 years is shown on TABLES 8-38 and 8-39.

Vegetative Production: Impacts of implementing grazing systems will be as described in Chapter 3. Initial forage production is expected to increase from 5,300 AUMs to 6,500 AUMs as a result of deferment. Plowing and seeding 11,000 acres will provide an additional 2,750 AUMs. Spraying and burning will increase production by 1,700 AUMs. As range conditions improve, livestock forage production in 20 years will increase to 17,000 AUMs (TABLE 8-40).

Wildlife

Management Area 3A:

Deer: Keying utilization to bitterbrush and limiting it to moderate use will ensure increased fall and winter browse for deer. However, the two pasture system will not allow sufficient recovery in areas easily accessible to livestock. Resting one-half of the area each year and delaying turnout until May 1 will allow for recovery of grasses and forbs, making more of them available to deer during the spring and summer. Habitat conditions are expected to improve enough to support a 5-10 percent increase in deer population (160-175).

Antelope: Spring and summer competition for forbs would be eliminated on 50 percent of the area each year. Plowing and seeding 2,400 acres will reduce antelope use to negligible levels on that area. Moderate use limitations and later turnout dates coupled with forage available in the rest pasture would provide habitat capable of supporting a 25-30 percent increase in the antelope population (to 195) in the area.

Sage Grouse: Sage grouse would be negatively impacted by plowing and seeding 2,400 acres of big sagebrush habitat. One-half the area would be free from removal of nesting cover and competition for forbs. Overall sage grouse productivity is expected to increase moderately.

Nongame Species: As general range condition improves and more layers are added to the vegetative structure, nongame wildlife use will change as described under the proposed action though vegetative recovery would be much slower and less dramatic than systems providing more rest and a seed trampling treatment.

Riparian/Aquatic Habitat: Fencing public sections of Sand Creek will provide dramatic improvement for wildlife as described for the proposed action.

Management Area 3B:

Deer: Deferment of turnout dates will increase grass and forb availability during the early spring green up period. Productivity may be increased resulting in a slight increase in the deer population, from 40 to 45.

Antelope: Spring competition for forbs will be eliminated on 50 percent of the area each year. However, this benefit will be largely negated by the increased intensity of grazing in the seed ripe pasture. Increased forage production resulting from later turnout dates on native range and seedripe treatment will benefit antelope. The small portion of the overall antelope population that utilizes this area (30-40) will increase to 35-45 animals.

Sage Grouse: Removal of nesting cover and forb competition will be increased in the early use pasture. Overall sage grouse productivity is expected to decline moderately.

Nongame Species: As general range condition improves, nongame wildlife use will change as described under other grazing systems. However, these changes will be much slower and less dramatic than in systems aimed at improving browse, meadow and other critical habitat types as well as perennial grasses.

Wilderness

Impacts would be as described for Alternative 5.

Social Economics

By the fifth year following implementation of Alternative 7, permitted livestock use would increase by 32 percent in Area 3A (from 5,821 to 7,691 AUMs) and by 38 percent in Area 3B (from 7,947 to 10,966 AUMs). However, accompanying this proposed increase in licensed use is a lengthening of the grazing season. Hence, permitted numbers of livestock will decline for 13 of the 18 operators running all or part of their planning unit permits in this sub-unit.

Proposed seeded areas in both management areas would mitigate the alternative's proposed reductions in numbers during the first month of the season (April 15 to May 15) for most of the sub-unit's permittees. Hence, feed limitations would mostly affect the permittees during the summer (roughly from mid-May through August or September). Inside flood meadows could be used by most of the permittees to handle the reduced numbers illustrated in FIGURE 8-9. By June most of these meadows would be dry enough to use as pasture without increases in calf sickness due to wetness. However, such use would probably eliminate potential hay production from these meadows. Indications from interviews are that about five to seven of the 18 ranchers in this sub-unit would be forced into the sort of choice between pasturing their hay meadows or looking for other sources of feed. The remainder of the permittees in the sub-unit either do not face reduced numbers or have some combination of rangeland or inside pasture sufficient to adjust to the alternative.

Impacts -- Sub-Unit 4, Mosquito

Vegetation

Management Area 4A: Impacts would be the same as those described for the proposed action.

East and Nevada Cowhead Allotments:

Vegetative Condition and Trend: Impacts would be similar to the two pasture rest-rotation system described for Management Area 3A in this alternative. The grazing end date of July 15 will prevent congregation of cattle meadows during the hot summer months. Use of bitterbrush and other browse species will be considerably less than the two pasture rest-rotation system in Management Area 3A since livestock do not normally begin to graze these species until July. Bitterbrush sites would improve two condition classes in 20 years. The response of grass and forb species would be similar to other two pasture systems previously described. Alternate year growing season rest is inadequate for heavily utilized plants to recover vigor and significant vegetative recovery will occur on approximately 80 percent of sites exhibiting high recovery potential.

Allocating forage to livestock from the rest pasture will result in modification of the grazing system during the phase-in period. Since the rest pasture will likely be grazed, little vegetative improvement is expected during the phase-in. Vegetation would not be allowed growing season deferment since all livestock use occurs prior to July 15. Reducing livestock use the 5th year will allow the grazing system to be followed and long term vegetative response will occur.

The vegetative condition and livestock forage production in 20 years will be as shown on TABLES 8-38 and 8-39.

Vegetative Production: Impacts of implementing grazing systems will be as discussed in Chapter 3. The April 15th turnout date for this area does not provide for any increased production as a result of deferment. Since modification of the grazing system is expected during the phase-in period and since little vegetative improvement will result, increases in forage production will be slight. Following the phase-in period it is expected that the production of the use pasture will have increased by approximately 25 percent. This will primarily be a result of vigor response from following the frowing formula during year 1, and increased production from additional water development. Burning 1,000 acres will increase production by 200 AUMs. As range conditions improve, livestock forage production in 20 years will increase to 4,400 AUMs (TABLE 8-40).

Crooks Lake, South Larkspur, and Boggs Allotments: Vegetative impacts will be similar to those described for the Board Corral, Wall Canyon, and North Nut Mountain Allotments of this alternative since the grazing system and season of use are similar. Significant vegetative improvement over most of the area is anticipated (TABLES 8-38 and 8-39).

Spraying and burning impacts would be similar to those described for Alternative 4. Vegetative production is shown on TABLE 8-40.

Little Valley, Holy, Mosquito, and Nevada Coleman Allotments: Vegetative impacts would be similar to those described for the Board Corral, Wall Canyon, and North Nut Mountain Allotments of this alternative. Significant vegetative improvement would occur on most sites.

Spraying 11,000 acres will have similar impacts as those described in Alternative 4.

The vegetative condition and livestock forage production in 20 years is shown on TABLES 8-38, 8-39, and 8-40.

Wildlife

Management Area 4A: Impacts would be the same as the proposed action.

Crooks Lake, South Larkspur, and Boggs:

Deer: Overall impacts to deer will be positive. Bitterbrush will continue to be overbrowsed because it is not a key species for establishing moderate use, but overbrowsing will be reduced by an estimated 10 percent. Forage competition will be eliminated on two-thirds of the area during the fawning season and first six weeks of nursing. Does will be healthier and will produce stronger fawns more capable of surviving. The May 1 turnout would further increase forage availability. A 20 percent increase (to 120) would be expected.

Antelope: The three pasture system would be expected to produce an increase in the density and variety of forbs, which are important spring food plants for antelope, in most habitat types. Competition for early spring forage between livestock and antelope would be eliminated on two-thirds of the area. The early use pasture would continue moderate competition between livestock and antelope on 30,000 acres. The net result would be an increase in general condition and productivity of antelope and a 50 percent population increase (120 to 180).

Sage Grouse: Increased plant vigor, increased vegetative density, increased abundance of grasses and forbs, and not grazing two-thirds of the area during the brooding season will all benefit sage grouse. Forage competition and removal of nesting cover will continue in the early use pasture. Meadows will improve, though not as rapidly as if fenced. Sage grouse populations are expected to show a moderate increase.

Nongame Species: Moderate use limitations and deferred and rested grazing treatments will improve habitat structure and food availability for most nongame species. Bird and small mammal use is expected to show a substantial increase similar to those described in Chapter 3.

East Allotment and Nevada Cowhead:

Deer: Overall impacts would be similar to those described for Management Area 3A with the exception that the July 15 removal of livestock would allow bitterbrush almost full rest from livestock grazing every year. On moderately grazed ranges livestock do not turn to bitterbrush until mid July. Livestock removal in July would also eliminate midsummer competition between deer and livestock on wet meadows when green vegetation is scarce.

The improvement of summer and browse forage would allow for a 20-30 percent increase in the deer herd (260 animals).

Antelope: The vegetative responses as described for deer would also benefit antelope and the improved habitat would be expected to support a 100-150 percent increase in antelope (200).

Sage Grouse: Sage grouse nesting cover removal and forage competition would be reduced 50 percent by using one-half the area each year. Overall sage grouse productivity is expected to increase moderately.

Nongame Species: As general range condition improves and more layers are added to the vegetative structure, nongame wildlife use will change as described under the proposed action though vegetative recovery would be much slower and less dramatic than systems providing more rest and a seed trampling treatment.

Riparian/Aquatic Habitat: Twelve Mile Creek would improve dramatically as described for the proposed action.

Management Area 4C (Nevada Coleman):

Deer: Condition and vigor of deer browse and cover plants would improve slightly as a result of the rest and seed ripe treatments. Bitterbrush may continue to be overbrowsed, but keying utilization to bitterbrush will reduce the level of impact. Competition for food would be eliminated on one-third of the area each year. Overall health and condition of deer would improve as a result of increased forage availability. The habitat would be expected to support a 10 percent increase (to 220 deer).

Antelope: Spring competition for forbs would be reduced on two-thirds of the area. Increases in abundance and variety of forbs would be expected throughout the area, as a result of the three pasture system. Increases in forage availability will yield improved health, better survival, and an overall increase in antelope productivity. Antelope are expected to increase by 50 percent to 205 animals.

Sage Grouse: Important meadows would be free of competition with livestock for nesting cover and forbs during the brooding season on two-thirds of the area. However, nearly 10 percent of the area would be burned or resprayed. This would eliminate 10,000 acres of big sage which is crucial for sage grouse nesting. The overall effect on sage grouse population would be significantly increased productivity on 60 percent of the area each year, but only a slight net increase in population.

Nongame Species: The moderate use limitation and deferred and rested grazing treatments will result in an increase in bird and small mammal use. Shrews, pocket mice, Savannah sparrows, and red-winged blackbirds would be expected to increase in numbers and deer mice, kangaroo rats, Brewer's sparrows, and horned larks would be expected to decrease in percent composition in 90 percent of the management area. The opposite will be true in the 10 percent of the area receiving cultural treatments.

Riparian/Aquatic Habitat: Fencing Coleman Creek would benefit wildlife as described for the proposed action.

Recreation

Impacts will be similar to Alternative 5 except the High Rock Canyon area will not benefit from total elimination of livestock grazing.

Impacts will be similar to Alternative 5 except the sheep grazing will continue west of High Rock Canyon.

Wilderness

Impacts will be as described for Alternative 5.

Social and Economic Conditions

Of the 14 operators in Sub-Unit 4 (including Bunyard, discussed in Sub-Unit 1 write-up), 5 operators would benefit moderately under Alternative 7, 3 would realize insignificant impacts, and 7 would be required to develop alternative feed sources for all or part of the grazing season.

After the initial phase-in periods, permitted AUMs in Sub-Unit 4 would be 23,185, a 25 percent increase over present levels. If the permittees are able to adjust their operations to take advantage of this increase, approximately 900 cows can be added to the approximately 3,700 head now using this area. This will have a positive impact on livestock sales in the region.

On the negative side, some of the ranchers in this sub-unit will see reductions in permitted numbers during some part of the grazing season. This is due to the proposed changes in seasons of use and, in a few cases, to the reductions in AUMs. The two Careys's ranches and Cockrell's Incorporated are affected thusly. However, since their permits in the East Allotment are such a small part of their annual feed schedules, the overall impacts on their ranches will be minimal. Three other ranchers (Bordwell, Harris, and Sagehorn) will also see reductions in numbers during portions of the season (FIGURE 8-10). However, increases at other times of the year may offset the loss.

Overall, Alternative 7 will greatly benefit some of the ranchers in Sub-Unit 4, while causing others to adjust their operations in conjunction with the proposed grazing system.

Mitigation

Mitigative measures described in Chapter 4 will also apply to this alternative.

The two pasture systems would be modified to provide two growing seasons rest during every three years on significant mountain brush sites. This would be accomplished using the prescriptive management specified for mountain brush sites under Sand Creek in TABLE 4-2. This would provide twice as much growing season rest and would significantly reduce the adverse impacts associated with grazing pressure in livestock concentration areas.

A livestock driveway would be created on the extreme western edge of Sub-Unit 1. A maximum 10-day sheep trail through would be allowed in March and November.

Unavoidable Adverse Impacts

The unavoidable adverse impacts in Alternative 4 relating to livestock related impacts on the various natural resources would continue save those from which livestock are excluded.

Increased livestock grazing throughout most of the study area would result in an increased attrition of cultural resource values on approximately 1

Operating changes would be required of permittees in Sub-Units 1, 2, and 4, though no changes are seen as making an operation nonviable.

ALTERNATIVE 8 - OPTIMIZED NON-CONSUMPTIVE USES

Description

This alternative is similar to the proposed action except that stocking levels in Areas 3A, 4B, and 4C are designed to achieve light utilization (20-40 percent) in place of moderate utilization (40-60 percent). Wild horse numbers would be allowed to increase to 1,150 head.

Initial stocking rates are as shown in TABLE 8-43.

Impacts

Soils

Impacts on soil would be as described for the proposed action except for slightly less erosion on Sub-Units 3A, 4B, and 4C. These differences are, however, negligible.

Water

As with soils, impacts on water would be similar to the proposed action.

Vegetation

Vegetation Condition and Trend: Impacts will be the same as described for the proposed action except in Areas 3A, 4B, and 4C. In these areas the utilization level of major forage species will be reduced from moderate to light. Less forage removal during the growing season will result in slightly higher levels of carbohydrate reserves following the early use treatment (Cook, 1966). This will slightly increase the rate of vegetative improvement over the proposal. This slight increase in rate of recovery is not expected to significantly alter range condition or forage production in 20 years since the proposed rest treatments are designed to allow improvement under various utilization levels. Reducing livestock use by 5,351 AUMs will result in increased litter accumulation and ground cover in these areas.

Vegetative Production: The initial and long-term forage production will be the same as the proposed action since range conditions are not expected to differ. Initially, forage production will increase from 55,000 AUMs to 72,000 AUMs and in the long-term, production will increase to 186,000 AUMs.

Threatened and Endangered Plants: Impacts will be similar as those described for the proposed action. Lighter utilization levels in Areas 3A, 4B, and 4C would further reduce the impacts on livestock grazing on any species that may occur.

TABLE 8-43

FORAGE CONSUMPTION SUMMARY

	<u>Livestock</u>	<u>Wild Horses</u>	<u>Antelope*</u>	<u>Deer*</u>	<u>Bighorn Sheep</u>	<u>Total</u>
<u>SUB-UNIT 1</u>	0	0	1,632	268	240	2,140
<u>SUB-UNIT 2</u>						
Mgt. Area A	0/957 ^{1/}	2,030	145	309	0	3,441
Mgt. Area B	Variable	1,949	131	185	0	2,265
Mgt. Area C	795	2,355	0	0	0	3,150
Mgt. Area D	0	0	0	0	0	0
Mgt. Area E	6,101	<u>8,607</u>	<u>508</u>	<u>1,132</u>	<u>0</u>	<u>16,348</u>
TOTAL	7,853	14,941	784	1,626	0	25,204
<u>SUB-UNIT 3</u>						
Mgt. Area A	4,284 ^{2/}	2,916	377	494	0	8,071
Mgt. Area B	<u>10,432^{2/}</u>	<u>0</u>	<u>58</u>	<u>0</u>	<u>0</u>	<u>10,490</u>
TOTAL	14,721	2,916	435	494	0	18,561
<u>SUB-UNIT 4</u>						
Mgt. Area A	2,121	954	0	1,543	0	4,618
Mgt. Area B	3,066	1,890	174	196	0	5,320
Mgt. Area C	<u>4,871</u>	<u>0</u>	<u>798</u>	<u>1,153</u>	<u>0</u>	<u>6,822</u>
TOTAL	10,052	2,844	972	2,892	0	16,760
STUDY AREA TOTAL	32,621	20,701	3,823	5,280	240	62,665

^{1/} 957 AUMs are grazed once every 3 years.

^{2/} Includes seeding AUMs.

* Represents actual quantity of livestock AUMs allocated for big game use. Due to dietary differences, the quality of forage for big game may be the limiting factor on populations. Actual use may therefore be less than allocated.

Livestock Grazing

Impacts will be similar to the proposed action. Initial reductions in livestock use pose significant adverse impacts to the amount of livestock harvested from BLM lands. Reducing utilization levels in Areas 3A, 4B, and 4C will improve the performance and weight gains of remaining livestock because forage availability will increase. These benefits, however, will not offset AUM reductions. In 20 years, livestock use will increase from the initial 32,000 AUMs to 78,634 AUMs.

Wildlife

In general, wildlife impacts will be identical to those described for the proposed action. In Management Areas 3A, 4B, and 4C, benefits will be slightly higher than for the proposed action and will occur at a slightly faster rate. Deer populations will increase by 100-125 animals and antelope populations by approximately 100-150 animals over the proposed action. Reasonable numbers would be exceeded for both species. Sage grouse production would increase slightly more than under the proposed action. Quail, chukar, small mammals, nongame birds and raptors would be affected as described for the proposed action.

Sub-Unit 1, High Rock Canyon: Impacts under this alternative would be identical to those described for the proposed action.

Sub-Unit 2, Massacre Mountain/Nut Mountain: Wildlife impacts in Sub-Unit 2 would be identical to those described for the proposed action.

Sub-Unit 3, Long Valley/Sand Creek--Management Area 3A:

Deer: Impacts to the 160 deer in this area would be similar to the proposed action. The light use limitation would ensure 40-60 percent more browse and increased grass and forb availability during green-up. Deer forage would improve to support a population increase to 240 deer.

Antelope: Antelope would be impacted as described for the proposed action but to a greater extent. Bitterbrush forage would increase by 40-60 percent and as range condition improved and provided more succulent spring vegetation, antelope production would also increase. Limiting utilization to light use (20-40 percent) would provide suitable habitat to support a population increase from 130 to 260 wintering and from 160 to 320 summering antelope.

Sage Grouse: Sage grouse would receive the same benefits as described for the proposed action. Reduced stocking rates designed to achieve light use would further improve succulent forage and reduce disturbance during the nesting season. A slight to moderate increase in sage grouse production would be expected.

Quail: Forage and cover would improve as described for the proposed action. This improvement would occur at a faster rate. Quail populations would increase significantly if this habitat improvement were coupled with favorable weather conditions.

Nongame Species: Small mammal and bird densities and species richness would show substantial increases as all habitat types approach site potential. Nongame species would benefit from increased cover and decreased disturbance resulting from lower stocking rates and the light use limitation.

Raptors: As prey species increase, raptor production may increase slightly. However, the overall production is not expected to change significantly due to the limit availability of suitable nesting sites.

Riparian/Aquatic Habitat: Fencing the portions of Sand Creek lying on public land would ensure their improvement for wildlife as described for the proposed action.

Management Area 3B: Impacts to wildlife in Management Area 3B would be identical to those described for the proposed action.

Sub-Unit 4, Mosquito--Management Area 4A: Wildlife in this area would be impacted as described for the proposed action.

Management Area 4B:

Deer: Vigor of important deer food and cover plants would improve greatly due to light utilization limits, rest, and seedripeness treatments. Bitterbrush utilization would be significantly reduced. Combined livestock and wildlife use would not be likely to exceed the moderate use level recommended to maintain bitterbrush vigor and regeneration. Increased grass and forb availability would yield healthier does, producing healthier fawns. Fawn survival would increase. Deer would be expected to increase from 75 to 95 animals.

Antelope: Reduced stocking rates and the proposed grazing system would benefit antelope in the same manner as described in the proposed action but to a greater extent and over a shorter period of time. Greatly increased succulent green forage, especially during the early spring would increase kid production and survival. Antelope populations would be expected to increase from 60-120 on winter ranges and from 190-380 on summer range.

Sage Grouse: Benefits to sage grouse would be the same as described for the proposed action. The light use limitation may allow for slightly higher production and population levels.

Nongame Species: Nongame species richness and population levels would increase as a result of the light use limitation and deferred and rest grazing treatments. Reduction of grazing use would improve habitat structure allowing for increased diversity, and increase forage and cover allowing for higher densities.

Management Area 4C:

Deer: A light use limitation would reduce current level of use by up to 60 percent. Reduction of livestock use and periodic rest from grazing would be expected to improve plant vigor and seed production, thus increasing deer browse availability and abundance. Decreased grazing pressure would improve habitat conditions. As deer habitat condition improves, deer production and survival would increase. Deer habitat would be expected to support a 40 percent increase in deer numbers from 400 to 560.

Antelope: The 275 antelope summering in Area 4C would benefit from the grazing system. Competition would be eliminated on 50 percent of the area each year. Competition would also be reduced in the use pasture due to the light use limitation. Reduction in competition and light use levels would substantially improve forage quality and increase forage quantity. Antelope production and survival would increase. An estimated 100 percent population increase would be expected. Summer residents would increase to 550 antelope.

Sage Grouse: No significant impacts are anticipated.

Quail: Quail would be impacted as described for Area 3A.

Nongame Species: Increased food and cover resulting from light use and frequent rest would have a beneficial impact on most nongame wildlife.

Cover would be maximized in the rested pastures and increased significantly in the grazed pastures. Reproductive success and populations of species requiring additional cover would increase. Improved structural diversity would increase species richness.

Raptors would have a greater prey base, but prey would have increased cover. Little significant change in raptor numbers would be expected.

Riparian/Aquatic Habitat: Impacts on Coleman and Twelve Mile Creeks would be identical to those described for the proposed action.

Wild Horses and Burros

Impacts would be similar to the proposed action. Providing less use in Management Areas 3A and 4B would increase the forage availability for wild horses in those areas. In Sub-Unit 2, the proposed grazing systems and utilization limitations would provide for improved range conditions and therefore increased forage availability for horses. In all cases the conditions for wild horses would be improved.

Cultural Resources

The impacts of this alternative would be the same as those of the proposed action, save that in Management Areas 3A, 4B, and 4C the intensity of livestock use would be less severe. The proposed reduction would affect a predicted 7,800 prehistoric sites by diminishing the adverse effects

TABLE 8-44

WILD HORSES AND BURROS

	<u>Existing</u>	<u>Proposed</u>
Sub-Unit 1	279	0
Sub-Unit 2	368	830
Sub-Unit 3	31	162
Sub-Unit 4	<u>29</u>	<u>158</u>
TOTAL	707	1,150

of livestock trampling, though all of these sites (including 15 properties believed eligible for inclusion in the National Register of Historic Places) would remain in the area of continued grazing-related impacts and could suffer significant depletion of their information contents.

Recreation

Impacts affecting recreation will be similar to the proposed action.

Visual Resources: Impacts will be similar to the proposed action.

Wilderness: Same as for the proposed action except for the Sheldon contiguous WSA within Management Area 4C, where light instead of moderate grazing utilization would enhance wilderness values by further improving vegetative vigor, increasing wildlife populations due to less competition for forage, improving the condition of the wild horse and burro herds, slightly decreasing soil erosion and lessening trampling of archaeological sites.

Social and Economic Conditions

Alternative 8 proposes identical grazing systems and seasons of use as the proposed action of Chapter 1. The alternative differs from the proposal in three management areas: 3A, 4B, and 4C. In these areas, the proposed stocking levels are reduced to achieve light rather than moderate utilization. For most of the ranchers in these areas, the economic impacts of the alternative will be much more severe than those incurred under the proposed action.

As seen in TABLE 8-45, this alternative would reduce permitted cattle grazing by 50 percent (from 56,730 to 28,922 AUMs (e.g., during non-use years in Area 2A)). The availability of spring forage/feed would become the limiting factor in most of the permittees' ranches. The severity of the probable reductions in ranch net returns would necessitate fundamental changes in ranch management and in permittee land ownership patterns.

All of the permittees would face operating cost increases resulting from the need to develop replacement feed sources. The number of operations which might not be able to adjust to the proposal and, thus, might be forced out of business would range from four to 20 ranches.

The proposal would have a slight impact on the economy of Modoc County. Annual sales within the county's livestock sector would decrease by about 4 percent. This would be insignificant when compared to the total value of the county's agricultural production.

TABLE 8-45

PRESENT USE AND USE UNDER ALTERNATIVE 8 BY OPERATOR

<u>Operator</u>	<u>Present Use (AUMs)</u>	<u>Use Under Alternative 8 (AUMs)</u>
Berryessa	2,178	1,590
Bordwell	1,040	521
Bunyard	3,248	1,228
L & L Cattle	3,133	1,384
Carey, F. & J.	121	87
Carey, J. & J.	154	111
Cockrell's	84	128
Coops	1,702	665
Earp	8,283	2,414
Hill	722	0/479
Fee	3,371	1,883
Hapgood	496	650
Harris	895	319
Heryford	1,100	557
Hill, Norene	2,004	2,625
Hussa	1,838	790
Jones	392	439
Kirkpatrick	2,433	3,056
Kyte	1,111	512
Laxague	1,104	950
Marx	1,588	580
Page	352	387
Parman, J.	1,364	467/946
Parman, R.	128	93
Peterson	369	399
Quirk	560	731
Schadler, G.	57	57
Schadler Ranch	6,315	3,902
Smith	166	217
Steward	560	506
Warren's Ranch	1,548	1,351
Weber	7,076	2,537
Wolfesen's	1,145	527
 TOTAL	 56,730	 31,664/32,621

The impact of the proposal upon the social character of the planning unit would be to accelerate the present trend towards fewer, larger livestock ranches. A decrease in the diversity of ranch sizes would increase stratification within Surprise Valley's dominant social group, the ranching community. This should decrease the feeling of identification with the ranchers by the non-ranching population.

The decrease in social diversity would limit the opportunities for intergroup contacts, thus weakening the present degree of social cohesion.

Sub-Unit 1, High Rock Canyon: The economic impacts upon Earp's ranching operation would be identical to those discussed under the proposed action.

Bunyard's sheep permit would be revoked under Alternative 8, with impacts similar to those discussed in Chapter 3. Bunyard's permitted cattle use in Sub-Unit 1 would also be revoked. His remaining cattle use in Management Areas 2E, 3B, 4A, and 4B would be reduced below those stocking levels permitted in the proposal. Approximately 40 fewer cows could be run than recommended in the proposal. However, this is still an increase of about seven percent (from about 954 to 1,018 AUMs). Similarly to the proposed action, Alternative 8 would severely restrict Bunyard's wealth and his income-generating capabilities by rendering his sheep ranch all but inoperable. Bunyard would be left with a small cattle permit scattered among several allotments. It is very doubtful that he would remain in business under Alternative 8.

Sub-Unit 2, Massacre Mountain/Nut Mountain: Nine operators use this sub-unit. The impacts of Alternative 8 would be identical to those discussed in Chapter 3 for Coops, Earp, Erquiaga, Hussa, Marx, and Weber. Three operators (Bunyard (see the Sub-Unit 1 discussion), Heryford, and Joe Parman) would face more drastic cutbacks than those under the proposed action due to this alternative's reductions in Management Area 3A.

Heryford: Alternative 8 would eliminate most of Heryford's present use in Area 2E (Wall Canyon) which occurs before June 15th. The general discussion of increased costs in Chapter 3 for Heryford is applicable here, although replacement feed costs for lost hay production from pasturing his flood-meadows during the springtime would increase a slight amount (less than 1 percent of the projected \$18,500 increase in feed costs).

Heryford would have to make very major changes in his style of operation if he were to remain in business under Alternative 8.

Joe Parman: Parman could run about 22 fewer head under Alternative 8 between May 15th and September 30th than he could under the proposed action. All impacts discussed in Chapter 3 would apply here, though the amount of additional pasture needed to accommodate the cutback in public land grazing would increase. Development and maintenance costs would

increase by about 25 percent from those mentioned in Chapter 3 (investment costs would increase from \$75,000 to about \$94,000 and annual operating and interest costs would increase from \$7,500 to about \$9,400). Parman would be especially hard-hit under Alternative 8 during the two out of three years of non-use in Area 2A, and would suffer overall financial losses from this alternative.

Sub-Unit 3, Long Valley/Sand Creek: Eighteen ranchers have either all or part of their planning unit permit in Sub-Unit 3. Alternative 8 proposes the identical changes from present use that are included in the proposed action, with the exception that the use of the native range in Area 3A would be reduced from moderate to light utilization. Comparison of FIGURE 8-13 and FIGURE 3-3 shows that most of the permittees will be affected by this change in use. Hapgood, Hill, Quirk, Smith, as well as Earp (discussed under Sub-Unit 1), would encounter identical impacts under this alternative to those discussed in Chapter 3.

For a general discussion of the impacts of the changes in seasons of use and numbers, see the Sub-Unit 3 general discussion in Chapter 3. It is the change from current patterns of use to those under the proposal that will have the major adverse impacts on the ranchers in this sub-unit.

The additional impacts of this alternative would be to increase the need for spring and summer forage for 13 of the permittees. This would increase the annual cost increases detailed in Chapter 3 from a slight amount up to about 35 percent higher than the proposed action's impacts.

Sub-Unit 4, Mosquito: The ranchers with the bulk of their planning unit permits in Areas 4B and/or 4C would face the most severe changes from the proposed action if Alternative 8 were adopted.

The discussion of the impacts of the changes in seasons of use included in Chapter 3 is applicable here. The change from the current early-season use to uniform numbers throughout the season will require modifications in nearly all of these operators' management. The extent of these changes and the estimated annual operating cost changes are discussed below.

Bordwell: Bordwell would have to develop additional feed sources for about 575 AUMs throughout the grazing season. A combination of spring-time hay purchases until his private meadow lands are dry enough for pasturage, and replacement winter feed purchases to replace the lost production on these meadows would add about \$12,000 to Bordwell's annual operating cost. Bordwell would have to make major management changes if he were to continue operating under Alternative 8.

Cal-Vada: Although portions of Cal-Vada's ranch have been sold, Alternative 8's impact on the total 1,978 active use AUMs will be considered.

This alternative would eliminate a month and a half of spring grazing on the public lands. Overall, Cal-Vada's permit would be reduced from 3,133 AUMs to 1,276 AUMs. Even restoring to highly productive irrigated pasture would require the purchase and/or the development of at least 320 acres to accommodate the 1,857 AUM reduction. Therefore, adjusting to Alternative 8 would require the holders of Cal-Vada's permit to either face substantial capital and operating cost increases or to reduce their herd by at least 240 cows.

Cary, F. and J., Cary, P. and J., Cockrell's Inc.: These three small permits in the East Allotment would all be affected similarly under Alternative 8 (see FIGURE 8-14). The present use of these low-altitude fields is for early use before the livestock is moved up to private or Forest Service range. Use under this alternative would probably render the permit useless to the permittees individually. If one operator were to lease all three of these permits, some usefulness may be realized from the area. Overall, however, the small size of these permits relative to these ranchers' operations would make even these substantial changes in permitted use insignificant.

Fee Ranch: Fee's present year-round operation is strongly centered around use of the 10-pasture Crooks Lake Allotment. Alternative 8 would cut a month and a half of early season use from this allotment and would reduce the number of cattle on the allotment during the early summer. Adjusting to this alternative would be costly. Feed costs from purchasing hay and from lost production could increase by at least \$25,000 per year. A combination of purchased hay for the early season loss and of purchase and development of pasture would add about \$100,000 in investment costs and would increase annual operating and interest costs by at least \$25,000. This alternative would require major changes in Fee's operation if he were to remain in business.

Harris: This alternative would delay Harris' present turnout date by a month (from April 16 to May 15) and reduce his permitted numbers by 101 head. Harris would have to make an investment of at least \$65,000 for irrigated pasture if he were to retain his present herd size. Harris may be able to remain in business under this alternative, but not without some substantial cost increases.

Kyte: Kyte's operation would lose a month of early season use (April 16 to May 14) and two months of late season use (October and November) for about 148 head. During the proposed grazing season (May 15 to September 30), 77 head could be run, a cutback of 73 head from present numbers. Replacement feed sources for the 69 percent reduction in AUMs (from 1,111 to 347 AUMs) would have to be developed if Kyte were to maintain his present herd size. Purchase and development of irrigated pasture would require an investment of about \$115,000 and would increase Kyte's annual expenses by at least \$11,500. Another adjustment to this alternative might be a combination of purchased hay and pasturing his inside meadows. Total hay costs from this alternative could run about \$10,000 a year. Whatever Kyte does in response to Alternative 8 will greatly increase his annual expenses.

Peterson: This operator uses Sub-Units 3 and 4. Peterson would not be significantly affected by the proposal. He presently turns out 136 head in Areas 4A and 4B on May 1. These are moved onto his Forest Service permit from June 16 to September 30. The rest of his cattle are kept on private lands. The proposal would delay most of his turnout by four weeks (to May 15) and would permit about 53 head to graze through September 30. If the proposal were adopted, Peterson figures that a two-mile gap fence across his private land in the West Allotment and a spray treatment would increase his forage production enough to handle the proposal's cutbacks. This treatment would require an investment of about \$10,000, adding about \$1,000 to his annual interest and operating expenses.

Sagehorn: Lonny Schadler currently owns an option on purchasing a portion of Sagehorn's deeded lands and associated grazing privileges. Since Leo Sagehorn is in the process of retiring from his ranch, the analysis will consider impacts upon the ranch itself rather than considering the overall impact on the rancher.

Alternative 8 would severely reduce the amount of public land grazing permitted to this ranch. Purchase of additional grazing land and/or a herd reduction would be necessary if this ranch were to remain operating. Purchase and development of sufficient pasture would cost at least \$200,000 and would increase annual expenses by at least \$20,000. Reducing the ranch's herd size by about 110 head would bring the annual feed supply into balance under the alternative. However, this would decrease annual net revenues by at least \$13,700. The Sagehorn Ranch would not be able to continue operating under this alternative without substantial increases in its annual operating expenses.

George Schadler: Since the BLM permit is a small part of Schadler's operation (Centaur Management Consultants, 1978), Alternative 8 would have only a slight impact on this ranch.

Schadler Ranches, Inc.: Schadler Ranches would be severely affected by Alternative 8. Early season use (from April 16 to May 14) for about 815 head would be completely eliminated. The proposal would allow a May 15 through September 30 grazing season for 388 head. This would be a loss of about 54 percent (from 3,779 to 1,746) over present actual use.

Pasturing his flood meadows to accomodate the spring cutback would require the purchase of about 640 tons of hay due to lost hay production, which would add about \$32,000 to Schadler's annual operating costs. Additional costs accruing to Schadler's operation would be associated with either fencing or loss of late fall use of intermingled private lands in Area 4A, increased medical and/or mortality costs from keeping cows and calves confined on private pasture during the spring, and possibly lower calving percentages and weaning weights from using lower elevation lands later in the year than he presently does.

Schadler would have to make many substantial and costly management changes if he were to remain in business under Alternative 8.

Wolfsen MC Ranch: Wolfsen's presently runs 274 head from May 1 to August 31. Alternative 8 would limit their turnout to 80 head from May 15 to September 30. If this alternative were adopted, Wolfsen's would find the average cost per cow to use the public lands prohibitive, and would probably let their lease on this permit revert to its owner, Anna O'Sullivan of Adel, Oregon.

The effect on anyone using this BLM license would be: (1) annual hay costs would increase by about \$16,000 to replace the loss in production from pasturing cattle on private meadowland; (2) gross revenues from weaner sales would decrease by about \$9,800 (net of grazing fee reductions) if a herd were reduced by a number proportional to the decrease in yearlong feed supplies (66 head); and (3) development of 130 acres of irrigated pasture would require an investment of about \$115,000 and would increase annual interest and operating expenses by about \$11,500.

The probable impact of the proposal would see Wolfsen's giving up their lease, and Mrs. O'Sullivan continuing to lease her grazing privileges to other ranchers rather than returning the ranch to a family-run business.

Mitigation

Mitigation measures as described in Chapter 4 would apply to this alternative.

Unavoidable Adverse Impacts

Unavoidable adverse impacts other than as described in this chapter for social economic impacts, would be as described in Chapter 5 for the proposed action.

CHAPTER 9

CONSULTATION AND COORDINATION WITH OTHERS

Chapter 9

CONSULTATION AND COORDINATION WITH OTHERS

The California and Nevada State Clearinghouses and State Historic Preservation Officers were notified prior to the development of the draft environmental statement. Much information was obtained through consultations at a working level with the Department of Interior and other Federal and State agencies.

Announcements concerning the preparation of the land use plan and subsequent DES were published in local and regional newspapers.

A coordinated planning group was created through the C2N Grazing Advisory Board and the two local Resource Conservation Districts. Local ranchers, Sierra Club, National Audubon Society, and Wilderness Society members; University of Nevada and University of California representatives, S.C.S., Fish and Wildlife Service personnel and Nevada and California Fish and Game Department biologists, the Modoc County Director (U. S. Agricultural Extension Service), BLM and others met for three two day workshops.

December 1977

An initial meeting and discussion were held to establish a clear understanding of divergent points of view and acquaint ranchers and environmental representatives.

February 23 and 24, 1978

A two-day public workshop to discuss the area's resources, resource condition, and possible management guidelines and alternatives.

March 7 and 8, 1978

BLM and U. S. Fish and Wildlife Service interagency planning meeting for Sheldon Antelope Refuge Land Management Plan.

March 9, 1978

BLM meeting with Nevada Open Lands Organized Council.

April 28 and 29, 1978

Second interagency planning meeting with USFWS for Sheldon Antelope Refuge Land Management Plan.

May 22 and 23, 1978

A two day workshop to discuss management alternatives and responses to BLM's preferred alternative.

June 22, 1978

The following environmental groups were briefed on alternative land use proposals and the proposed action to be presented in the DES: Wild Horse Organized Assistance (W.H.O.E.); National Wildlife Federation; National Audubon Society; Sierra Club; Wilderness Society; Natural Resources Defense Council; Wildlife Extension Specialist, University of California; BLM State Office and District Office personnel.

June 29, 1978

A briefing was held for ranchers, Nevada State Fish and Wildlife Service and Nevada Department of Fish and Game on the proposed land use plan and proposed actions for the DES.

July 6, 1978

The third two-day workshop discussed interagency planning efforts. It was hosted by U.S. Fish and Wildlife Service at Sheldon Refuge.

Coordination in the Review of the Draft Environmental Statement

Many of Federal, State, and local agencies, environmental groups and local individuals have been contacted for assistance in the preparation of this statement. The Draft Environmental Statement was provided for them to review. Comments received on the DES have been incorporated into this chapter.

LAW OFFICES
McCANDLESS & BARRETT

TENTH FLOOR

1707 H STREET, N. W.

WASHINGTON, D. C. 20006

ROBERT C. McCANDLESS
DAVID M. BARRETT
RUSSELL J. GASPAR
RICHARD S. REISMAN
ROBERT R. LOCKLIN
JOSEPH E. SCHULER
DANIEL RIESEL *

April 23, 1980

(202) 223-8440
CABLE: "SOONER"

NEW YORK OFFICE:
425 PARK AVENUE
NEW YORK, NEW YORK 10022

* ADMITTED IN NEW YORK ONLY

Dept. of Interior

RECEIVED

APR 28 1980

**BUREAU OF LAND
MANAGEMENT
SANTA FE, CALIFORNIA**

Rex Cleary
District Manager
Susanville District Office
U.S. Bureau of Land Management
P.O. Box 1090
Susanville, CA 96130

Dear Mr. Cleary:

The American Horse Protection Association, Inc. has examined the Draft Environmental Impact Statement (EIS) for the Cowhead/Massacre Planning Unit and appreciates the opportunity to submit its comments.

1 BLM's attempts to improve both immediately and on a long-term basis the productivity of the public rangelands in this area is a laudable goal. However, when those improvements are brought about primarily at the expense of the wild horses and burros inhabiting the rangelands, the proposals will not be tolerated by AHPA. The planned reduction by 54% (from 575 to 267) of the wild horse population, and the elimination of the only 2 burros in the Cowhead/Massacre area, are clearly unwarranted and unjustifiable from any standpoint.

Putting the Draft EIS into proper perspective, it is obvious that it was never intended to analyze or even seriously consider the condition of wild horses and burros in the area. "The chief concern in this reassessment of resource capability was limitation of livestock utilization in areas of overuse, thus reducing impacts upon the range resource and other resources." (p. 1-4). Consequently, BLM failed to collect sufficient and accurate data upon which its proposed action for the removal of wild horses and burros can now be justified. In this sense, the draft EIS is seriously flawed, because it inadequately considers the program's effects on wild horses and burros

and alternatives to the proposed action. This violates the mandate of the National Environmental Policy Act's (NEPA), (42 U.S.C. §4321, et seq.), that the EIS fully consider the environmental effects of this major government action.

2 | For example, the Draft EIS states that aerial inventories conducted in 1973-77 indicated an annual wild horse population increase of between 17 and 21%. Nowhere in the Draft are the specific results and methodologies of such inventories published, and nowhere are the inventories broken down into colt/mare population statistics. It would be helpful to know whether the increases were attributable to unique herd compositions or characteristics which are unlikely to repeat themselves in the near future. BLM's proposed massive reduction could leave the wild horse herds in a state of marginal existence due to reproduction problems within various wild horse bands. Further inventories and studies are necessary so that all potential deleterious effects on wild horses and burros stemming from the proposed action can be avoided.

3 | As a second example of the paucity of information concerning wild horses and burros, the Draft contains no statistics as to the exact or even approximate degree of dietary overlap between wild horses, wildlife, and livestock. The Draft acknowledges that "forage preference was determined by a dietary analysis study conducted immediately adjacent to the study area in 1976 and 1977." (p. 2-2). Hence, no research was specifically conducted to determine the exact problems, if any, of dietary overlap between wild horses and other animals inhabiting the Cowhead/Massacre area.

Third, there is little if any data clearly revealing the extent of competition between horses and livestock in the wild horse area, or the extent to which grazing problems, if any, in the wild horse areas are attributable solely to overuse by livestock rather than by horses. This is the only practical means of determining whether any wild horse removal is necessary.

4 | In fact, the real achilles heel of the entire Draft is its failure to identify wild horses and burros as the culprits in the deterioration process of the rangelands in question. It is unequivocally stated that "the major disturbance factors responsible for the retrogression of most sites have been livestock grazing and the control of natural fires. The effects

4 of these have been the reduction of major perennial grasses and forbs and an increased abundance of shrubs." (p. 2-7). The Draft confesses that the present problem of poor vegetation is principally, if not wholly, due to livestock overuse. Grazing capacities were determined in 1963, but grazing use was adjudicated between 1965 and 1968, resulting in the present licensed use of 56,730 AUMs for livestock -- well in excess of the grazing capacity of only 49,675 AUMs. "Range condition and trend surveys by the BLM in 1977 indicated the ranges are in poor condition and have improved little since 1963, indicating that present stocking is too high for the resource in its present condition." (p. 1-4). The acknowledged culprits are the livestock operators who have overtaxed the range vegetation by exceeding the livestock carrying capacity. Hence livestock removal and reduction seem the appropriate solutions for bettering the habitat in certain areas. Indeed, the logical course of action is one which immediately reduces and prophylactically limits livestock grazing rather than the proposed action which serves to penalize and limit both present and future wild horse use.

5 The approach taken in the Draft EIS is typical of the kind used by the Bureau in its planning documents. As is usually the case, there is a call for an initial decline in livestock use associated with a change in the nature of the grazing program. The stated purpose of these programs is to increase range conditions and productivity over a fifteen or twenty-year period. However, the Draft makes it clear that livestock usage will increase to levels beyond the normal use as range productivity improves, while wild horse populations will remain fixed at the low initial level, 267 horses in the present case.

The conclusion to be drawn from this is obvious. Wild horse populations are reduced -- permanently -- to levels that are comfortable to livestock operators. Livestock use, which was responsible to the largest degree for the degradation of the range over the past years, will be temporarily reduced, but will be permitted to enjoy the fruits of range improvement that wild horses will be denied.

AHPA is vehemently opposed to this policy of treating wild horses and burros as "second class citizens." If all range uses must be reduced in order to restore the vigor of the plant base, reduce erosion, improve ground cover, and

encourage the growth of native, preferred plant species, then the burden should be shared equally and the benefits of future productivity made available to all users.

6 Clearly, this is not happening here. The proposed action calls for a long-term increase in livestock grazing of up to 95,632 AUMs, with wild horses and burros enjoying no such corresponding benefit. Instead, "the availability of forage [for wild horses and burros] would vary with grazing management systems and livestock utilization limitations." (p. 3-18). What this really means is that wild horses and burros are allowed to share in future range productivity only to the extent that forage is left over from livestock use, a proposal which flies in the face of the Wild Free-Roaming Horses and Burros Act (16 U.S.C. §133, et seq.) Congress did not intend that livestock be given the lion's share of the resources on the public lands. Wild horses and burros are entitled to at least a co-equal, if not preferred, status with livestock and wildlife in the Cowhead/Massacre Planning Unit.

7 The fact that the Draft EIS has not even accorded wild horses and burros a co-equal status is blatantly obvious. Besides the glaring omission of a future increase for wild horse populations corresponding with increases in range productivity, the Draft imprudently acknowledges that in most uses, wild horses ran dead last in the race for resource priorities. For example, in Sub-Unit 1, the High Rock Complex, "the following priority was used to resolve resource management conflicts: archaeological and historic resources, wildlife, wilderness, recreation, livestock, wild horses." (p. 1-4). In Sub-Unit 2, wild horses again were listed last in the group of resource priorities. (p. 1-10). In Sub-Unit 3, wild horses were not even listed as a priority user (p. 1-15), and in Sub-Unit 4, wild horses came in next to last, followed only by recreational usage. (p. 1-19).

8 BLM attempts to rationalize its proposed removal of 312 wild horses by labeling such action as beneficial to wild horses in general. "Animal health is judged to be satisfactory under present conditions but would be expected to improve because of increased availability of preferred forage species." (p. 3-18) (emphasis added). First of all, it is evident from the satisfactory health of wild horses in the area that an ecological balance has been struck between the wild horse population and

the surrounding rangelands. There is no reason to doubt that healthy herds can be maintained without BLM action if the wild horse population is left alone to either grow or diminish according to the vegetation available.

8 Secondly, the Draft's assertion that removing 312 wild horses from their natural habitat will provide "a benefit" to the wild horse population strikes AHPA as the height of absurdity.

The draft EIS characterizes its proposed initial reduction of livestock grazing as a "short-term adverse impact" to livestock operators, yet this same type of cancellation and reduction in wild horse use is misnomered as a "long-term benefit" to wild horses.

The obvious goal of the proposed action is to increase the long-term availability of forage for domestic livestock grazing. Clearly, the interests and concerns of livestock operators were given highest priority by the drafters of the EIS. One need only look at the "alternatives" set forth to the proposed action to have this general conclusion reaffirmed.

9 Alternate plan 1, "No Action," is clearly no alternative at all since deterioration of the rangelands will continue if livestock grazing is not held in check, a fact explicitly acknowledged in the Draft EIS.

10 Alternatives 3-8, with the exception of 5, all mimic the proposed action in calling for the drastic reduction or elimination of wild horses and burros. The fifth alternative plan, which allows increases in wild horse and burro populations, has been dismissed outright by the Bureau as economically unfeasible.

11 "The Elimination of All Livestock Grazing," alternative #2, is undesirable because it sets up an "either/or" situation between livestock and wild horse grazing. Nothing in the Draft excludes the possibility that wild horses could be maintained at or near their present level while reducing livestock use to the proposed AUM allocation set forth in Table 1-1 (p. 1-5). This alternative would allocate a total of 47,054 AUMs, a figure well within the estimated carrying capacity of the Cowhead/Massacre Unit.

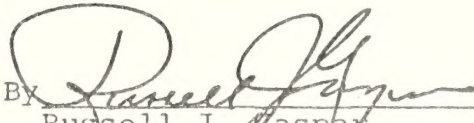
11
Livestock, wildlife and wild horse populations would then be allowed to increase as range productivity improved over the years. This alternate proposal has the benefit of placing responsibility for range deterioration where it properly belongs, in this case, upon livestock operators who have overused the public rangeland in the Cowhead/Massacre area. At the same time, this proposal will effectuate the goals delineated in the Draft EIS, (p. 1-1), which includes improving the ecological condition of public lands and managing livestock grazing at a level compatible with other resource needs, including those needs of wild horses and burros.

12
AHPA reminds the Bureau that the role of the wild horse and burro on public lands has been mandated by Congress. The Wild Free-Roaming Horses and Burros Act (16 U.S.C. §1131 et seq.) gives those animals at least an equal status in the multiple-use policy for public lands. The Draft EIS fails even to afford the wild horse consideration as a use of equal importance.

AHPA urges the Bureau to reconsider its Draft EIS in light of more recent data on dietary overlap, resource competition and wild horse population trends, and to determine whether a grazing plan with less impact on the wild horses and burros in the Cowhead/Massacre Area can be developed.

Very truly yours,

McCANDLESS & BARRETT

By 
Russell J. Gaspar
Attorneys for AHPA

RJG/11
cc: Joan Blue

Comment

Response

1. The Proposed Action represents the management goal of managing a population of 267 wild horses as an integral component of an ecosystem, which also includes wildlife and livestock. This number (267) has been established as a reasonable number of horses to manage for, and is outlined in the Susanville District's Wild Horse Herd Management Area Plans.
2. Methodology and results of wild horse inventories 1973-1979 are on file in Susanville and Cedarville BLM offices. The 17-21% annual increase is apparently typical of wild horse and burro populations throughout the West and not a result of unique herd composition.

To say that the "proposed massive reduction could leave the wild horse herds in a state of marginal existence due to reproductive problems . . .," indicates a lack of understanding of the history of horse populations and the Proposed Action in Cowhead/Massacre. The proposal to manage for 267 wild horses would ensure the maintenance of a population equal or greater than 1971 levels, and probably higher than they had been at any time prior to 1971. Wild horse numbers increased from approximately 267 to 705 (164% increase) in 8½ years. There is no reason to believe that reducing them back to 267 will now create a marginal existence or reproductive problem.

3. Ecological sites in Cowhead/Massacre are basically the same as in Tuledad/Home Camp. Application of food habits data is no less valid for Cowhead/Massacre than for Tuledad/Home Camp.
4. This omission has been corrected in the Final Environmental Statement.
5. As previously mentioned, the 267 wild horses was one of the primary planning unit goals. Reasonable numbers of deer and antelope have also been identified. Forage in excess of that needed for reasonable numbers of horses, deer, and antelope and that needed for watershed protection will be allotted to livestock in order to meet other land use objectives.
6. Congress intended that wild horses and burros be managed, along with all other resources, as an integral part of the natural ecosystem. The Proposed Action fulfills that intent.
7. Although other resource values were given higher priorities, this is not to imply that horses were overlooked or not treated as an integral part of the overall resource values in Cowhead/Massacre. The priorities resulted from BLM's planning process. In these particular areas, other resource values were highly concentrated and suitability as wild horse range was somewhat limited. This resulted in the priorities as identified in the DEIS.

Comment

Response

8. The approach that satisfactory health in wild horses indicates an ecological balance is a somewhat simplistic viewpoint. Rabbits in Australia and deer on the Kaibab Plateau in Arizona thrived for a period of time as well. However, in neither case was there an ecological balance. Eventually the rabbits increased to the point of causing depredation problems and the deer increased until forage was overgrazed to the point where they eventually starved. The tremendous deer die-off could have been prevented if the population had been held to a reasonable number. The Proposed Action ensures that such a fate does not befall the wild horses.
9. The "No Action" alternative is a legal requirement of ALL Environmental Analyses and Impact Statements.
10. First of all, at this point, no alternative has been dismissed totally. No decisions have as yet been made. When decisions are made, components may be picked and chosen from several alternatives and/or the Proposed Action. Alternative 8 has been altered to evaluate a proposal similar to the Proposed Action with substantial increases in horse numbers.
11. Alternative 2 has also been changed, to more accurately provide a baseline for comparison of range improvement under various alternative proposals.
12. See Response Number 6.

Natural Resources Defense Council, Inc.

25 KEARNY STREET
SAN FRANCISCO, CALIFORNIA 94108

415 421-6561

Washington Office

1725 I STREET, N.W.
SUITE 600
WASHINGTON, D.C. 20006
202 223-8210

New York Office

Dept. of Interior 122 EAST 42ND STREET
NEW YORK, N.Y. 10017
212 949-0049

April 10, 1980

RECEIVED

APR 14 1980

**BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA**

C. Rex Cleary
District Manager
Susanville District
Bureau of Land Management
P. O. Box 1090
Susanville, California 96130

RE: Draft Environmental Impact
Statement/Proposed Livestock
Grazing Management for the
Cowhead-Massacre Planning Unit

Dear Rex:

As you know, the Natural Resources Defense Council, Inc. (NRDC) has long been concerned about the management and current conditions of the publicly-owned rangelands in the Susanville District and elsewhere throughout the West. We support the efforts of the Bureau of Land Management (BLM) to manage livestock grazing on these lands according to the multiple-use and stewardship principles mandated by the Federal Land Policy and Management Act (FLPMA) as well as to comply with the requirements of the National Environmental Policy Act (NEPA) in so doing. Indeed, we believe that adequate range environmental impact statements (EIS's) are the key means by which the management actions necessary to comply with FLPMA's mandates can be identified and their implementation supported. The above-captioned draft confirms this belief. I am very pleased to submit the following comments on its contents and to

support the proposed action with which it deals. In addition, as discussed more fully below, I would also support the economic assistance contemplated by Alternative 3 under certain conditions.

As you know, this is the second range EIS produced by the Susanville District. Its preparers are to be commended for their efforts. The document represents a significant improvement over the earlier statement on the Tuledad/Home Camp area, as well as a number of other, more recent drafts which I have reviewed. In general, the draft is very well written and organized. The description of the proposed action, its rationale and the tradeoffs inherent in it are excellent. The description of the MFP goals and objectives is extremely clear and straightforward. Summary Table 9 is an admirable innovation.^{1/} The aerial approach to both land use planning and impact assessment is another useful innovation: it clearly facilitates analysis of the goals, resource tradeoffs and impacts of alternative management options.^{2/} The descriptions of the manner in which carrying capacities, initial stocking rates and environmental impacts were derived are also very clear. The techniques used appear sound. In

1/ This Table needs to be clarified in two respects: (1) it contains an apparent typographical error in the third land use goal, i.e., "615,000² acres"; and (2) the description of the stream habitat conditions that would occur under Alternative 7 is contradictory.

2/ I assume that the post-EIS decisions for this unit will also be based on this approach.

addition, unlike many previous EIS's, the alternatives considered are, in fact, real alternatives to the proposed action. They also involve a range of livestock numbers, although most of them are obviously weighted toward livestock grazing. Cost estimates for construction and maintenance are supplied.^{3/} The treatment of wilderness values, at least in the High Rock sub-unit, is far better than any other range EIS to date.^{4/} The analyses of the archeological and non-game resources of the Unit are unusually well-done, while the socio-economic issues are treated in an exceptionally pointed and precise manner.^{5/}

The proposed action with which this EIS deals

3 | ^{3/} I assume that some of the alternatives, including the proposed action, will require additional personnel. If so, these added costs should be included in the final EIS as should cost-benefit analyses of the alternatives, including the proposed action.

4 | ^{4/} Unfortunately, it is not clear whether there are any potential wilderness areas in the Unit outside of the High Rock area. If, in fact, there are, the final EIS should identify them clearly and provide pointed analyses of the impacts of all alternatives upon them.

5 | ^{5/} The draft indicates that the socio-economic analyses were based, in large part, on interviews with the ranchers involved and reflect their assessments of the impact of proposed reductions on their operations. It states that, in the case of "major reductions", these "assessments are probably reliable." (P. 3-20.) Frankly, I question the reliability of these assessments under the circumstances. Also, it is not clear to me that the economic analyses reflect published literature which indicates that ranchers in this area will benefit economically from reducing their dependance on public lands and making more efficient use of their private lands. See Bullock, Arnold E., "Irrigated pastures may be a good investment," Rangelands 1(5), Oct. 1979, p. 192.

represents a marked improvement over all others that I have reviewed. It flows clearly from the planning process. (Table 1-11.) If implemented, it would benefit all of the diverse, publicly-owned resources of the Cowhead-Massacre Planning Unit, including those which are now being adversely impacted by livestock use. Unlike earlier proposed actions, the instant action is not oriented solely or even predominantly towards livestock grazing. It does not accept grazing as the dominant use of the area involved to which all other uses must continue to be subordinated. Instead, it treats grazing as just one of several equal, multiple uses of the area's resources. The proposed livestock use is clearly based not only on the forage capacity of the specific areas or sub-units, but also on the demonstrated needs and values of the other resources in those units. The specific grazing management actions proposed are notable in several respects, including their attention to the serious problem of too-early spring grazing, their recognition of the need to adjust initial stocking rates to take into account rested pastures, Table 1-2, p. 1-6, their comparatively low cost, their balanced approach to intensive livestock management and vegetative manipulation as well as their direct relationship to the land use goals and objectives for the Unit.

The one problem I have with the proposed action concerns its failure to provide criteria for the vegetative manipulation projects which it contemplates, particularly the seeding projects. This is also a problem with all but one of

6 the alternatives considered. Indeed, it is an even more serious problem with most of those alternatives, because they contemplate much more extensive seeding than does the proposed action. Specific criteria for projects need to be adopted in order to guide and constrain the selection of treatment areas. In particular, they should incorporate the following standards: 1) seedings will only be proposed in areas that would not be expected to respond to grazing management systems (p. 1-15); 2) seeding will only be proposed in areas in which ecological factors such as soils and precipitation are such that seed germination and establishment of seedlings will occur (Id.); 3) seedings will not be undertaken in known critical wildlife habitats; and 4) seedings must be cost-effective and justifiable. Because decisions to engage in seedings are essentially decisions to allocate the lands involved to livestock use, at least as contemplated by the proposed action and grazing alternatives, these criteria must be incorporated into the Unit's land-use plan.

But for their failure to include the criteria outlined above, the land use goals and objectives for the Unit are notably specific and quantified. As such, they are markedly different from the type of generalized, "motherhood" statements that have traditionally characterized and undermined many Bureau planning efforts. In general, they are sound, realistic

and appropriate multiple-use goals.^{6/} However, the failure of all alternatives, including even the "no grazing" alternative, to achieve the objective of having 615,000 acres in good condition in about twenty years suggests that this may not be a realistic goal.^{7/} In addition, the objective of stabilizing the "social and economic environment of the local community," p. 1-1, while laudable, is inappropriate and far exceeds the Bureau's statutory mandates.

The Bureau is a resources management agency, not a social welfare agency. Its task is to develop and implement sound management plans for the Public Lands which will benefit

7 | ^{6/} The MFP's reference to "areas with special environmental concern", p. 1-1, is confusing, since the statutory language is, "areas of critical environmental concern" (ACEC's). FLPMA §§ 103(a); 201(a); 202(c)(3). Bureau regulations provide for the identification of such areas through the planning process. The draft EIS clearly reveals that there are a number of areas of special or critical concern in the Unit, including, for example, High Rock and riparian areas. However, none of the alternatives, including the proposed action, contain specific proposals to nominate any of these areas as ACEC's as required by those regulations. The final EIS should make clear which areas are being proposed for this status under each alternative as well as which, if any, qualified areas have been eliminated. The reasons for eliminating such areas should also be supplied.

8 | ^{7/} The failure of this goal to be reached even under the "no grazing" alternative may be a function of the increased wild horse numbers that are part of this option. These increased numbers are inconsistent with the purpose of analyzing this alternative, which is to provide baseline information against which to measure the environmental impacts of all other alternatives involving grazing by non-wildlife, non-native animals. The final version of this EIS might well correct this particular deficiency by considering an alternative which is designed to maximize wild horses while allowing livestock use. Cf. Alternative 8.

all of their multiple uses and improve their current conditions. By so doing, it will benefit all users of these lands, including members of the Public Land livestock industry, so many of whom, like many of the ranchers involved here, are marginal operators, have outside employment, and face rising costs as well as increased pressure to sell their ranches. See p. 2-57 to 2-60, 3-21.

This is not, of course, to say that the Bureau should not attempt to mitigate the economic impacts of its management actions when it can do so in a manner which is consistent with its stewardship responsibilities. Indeed, such mitigation is inherent in the proposed action which makes livestock use essentially the dominant use of the areas which are most important economically to the majority of the ranchers involved. See Table 2-29, p. 2-26. As such, the proposed action does, in fact, contribute to the economic and social stability of the community. In Alternative 3, the draft also considers another form of mitigation, one which NRDC has advocated in the past.

Alternative 3 contemplates providing ranchers in the area with direct financial assistance. The draft indicates that such assistance may be both desirable and justifiable. Thus, although existing livestock numbers contribute little to Modoc County's livestock sales, most of the ranchers involved are quite dependent on the Public Lands. (Pp. xxi, 2-60 to 2-63.) In addition, the amount of money involved is

reasonable. Moreover, the total costs of Alternative 3 would be less than all the other alternatives involving livestock use, except Alternative 4. See Summary Table 8.^{8/} Finally, the environmental and socio-economic benefits of this approach far outweigh all other alternatives, including those which involve smaller reductions in livestock numbers and hence fewer adverse socio-economic impacts. See Summary Tables 1-9.

9 | There are, however, problems with Alternative 3. The draft acknowledges one of them -- i.e., that the Bureau does not now have the authority to use federal funds to help ranchers adjust to needed changes in current management. (P. 8-17.) There is also the question of whether such assistance is in fact needed. As indicated above, I am skeptical about the reliability of the economic impact predictions contained in the draft, given the techniques used to make them. See footnote 5 supra. In addition, the draft does not reveal whether any attempt was made to determine the degree to which existing federal agricultural assistance programs, such as Farmers Home Administration loans, could be used by ranchers to offset the impact of reductions. As revealed in a report recently submitted to Congress by the Secretaries of Agriculture and Interior, such programs might well obviate the

10 | ^{8/} The "true" cost of Alternative 4 is probably considerably higher than is shown in Table 8, since that estimate does not appear to include the cost of the intensive monitoring which is contemplated. See p. 8-21. The added expense should be included in the final statement.

need for any direct assistance or new legislation. See "Potential Federal Agricultural Financial Assistance for Mitigating Reductions in Grazing Use on Public Rangelands" (February, 1980). At the very least, they could reduce the amount of money needed to prevent bankruptcies and increase the productivity of base property in the area. (P. 8-17.) The final EIS should address these issues. If it reveals that there is, in fact, a need for direct assistance, I would be happy to support Alternative 3 and I believe that Congress might well do so too.

As indicated above, the draft considers several alternatives which involve levels of livestock use which are higher than the level contemplated by the proposed action. All of these alternatives subordinate the protection and enhancement of non-livestock uses of the Unit's resources to livestock use in order to minimize reductions and their socio-economic impacts. As the result, none of these alternatives would achieve as many of the land use planning goals of the Unit as would the proposed action. See Summary Table 9. In my view, each of these alternatives suffers from serious deficiencies. In what follows, these deficiencies are discussed briefly.

Alternative 4, the rancher-developed alternative, is patently inconsistent with the obligations imposed on the Bureau by FLPMA as well as by NEPA and the Public Rangelands Improvement Act (PRIA). It would maintain the status quo

11 for livestock at the expense of the Unit's significant publicly-owned wildlife, riparian, archeological and primitive resources as well as the public treasury which would have to pay for the proposed "range improvements" and intensive monitoring systems. The alternative places heavy emphasis on monitoring, despite the fact that the BLM in general and the Susanville District in particular, have yet to engage in systematic monitoring, let alone develop and implement sound, realistic monitoring systems. While this alternative would meet the needs of operators, at least in the short-term, it overlooks the fact that the Bureau's needs and responsibilities are significantly different. The Bureau simply cannot ignore, or refuse to act upon, the information contained in this document which reveals that changes in current management are needed to eliminate overgrazing, correct other improper management practices and achieve multiple-use objectives, including improvement in current resource conditions.

12 While Alternatives 5, 6 and 7 would have more positive environmental affects than Alternative 4, they hardly qualify as multiple-use plans. None of them would give grazing management systems an opportunity to improve conditions before resorting to vegetative treatment projects. This is particularly true of Alternative 5, which contemplates massive vegetative manipulation as well as extensive fencing and water developments. Such manipulation is biologically unjustifiable

13 and inconsistent with the concept of multiple-use. While the environmental assessment of this alternative is far too general, given the magnitude of all the management actions contemplated, clearly it would have extremely serious effects, particularly on wildlife and archeological values. In addition, the basis for the initial stocking level is not at all clear. In particular, it is not clear whether the amount of use shown in Tables 8 and 8-23 will be permitted prior to the establishment of seedlings in treated areas, the removal of wild horses, and the construction of new water sources, p. 8-33, or whether it will only be permitted after these necessary prerequisites have been met. Id. Comparison with the proposed action as well as Alternative 7 suggests that the initial stocking rate should be much lower. Finally, Alternative 5 is extremely expensive and undoubtedly could not be justified by any objective cost-benefit analysis.

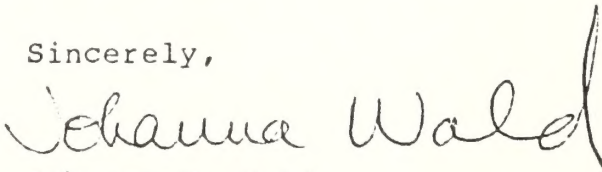
Alternative 6 is less expensive than Alternative 5, but probably could not be justified economically. In addition, as is the case with Alternative 5, the basis for the initial stocking level is not clear. Its failure to protect critically important meadows, aspen stands and riparian areas appears to violate the BLM's guidelines regarding wetlands-riparian area protection and management. 45 Fed. Reg. 7889-7895 (Feb. 5, 1980). Finally, as noted in the draft, its viability is dependent on decisions which have yet to be made by the U. S. Fish and Wildlife Service with respect to livestock grazing on the Sheldon Antelope Refuge. In that regard, you may be

interested to know that I have concluded that the proposed action for the Sheldon is less desirable for wildlife than the proposed action for the Cowhead-Massacre Unit, as well as that the EIS does not meet NEPA's requirements. While Alternative 7 would protect several of the "archeologically sensitive" areas in the Unit, p. 8-102, overall, it would have significant adverse impacts on the area's outstanding archeological resources. Indeed, in some places the adverse impacts would exceed those under the current situation. Id. In addition, the land use objective for the unique High Rock area would not be met. The environmental analysis does not appear to acknowledge all of the impacts to wildlife of the proposed new water sources, Cf. p. 8-28, or the fencing.

In conclusion, I congratulate you and your staff on an excellent EIS and proposed action. I urge you to retain that action as the proposed action in the Final EIS as well as to implement it in the Planning Unit and thereby stabilize and improve resource conditions. I hope you will in fact select the proposed action.

Thank you in advance for consideration of these comments. If you have any questions about them, I hope you will contact me.

Sincerely,


Johanna H. Wald

JHW/jt

Comment

Response

1. The Table has been corrected to remove two typographical errors and the description altered to remove contradictory statements.
2. This approach will be carried into the decision making phase.
3. The amount of additional personnel required is not expected to have environmental impacts so it has not been estimated and included. Cost-benefit analyses are prepared by BLM on allotment management plans (AMPs). This step follows the environmental statement and resulting forage allocation decisions. No cost-benefit analyses are available now.
4. A map showing Wilderness Study Areas has been added to the final document. When the draft was prepared, the inventory had not been completed.
5. The socio-economic analyses were based upon rancher interviews and ranch budget modeling. The interviews were conducted with the assistance of a USDA Cooperative Extension Agent experienced with livestock operations in the Study Area. The interviews were not the primary source of socio-economic input but were important in determining the ability to make significant changes in the operation. The suggestion that ranchers "will (emphasis) benefit economically from reducing their dependence on public lands and making more efficient use of their private lands" is very simplistic. Some ranchers may be able to follow Bullock's recommendations while for others, limitations on land and capital may be substantial. The major reason for rancher interviews was to determine what those limitation are for each operation. The costs of increasing production on any land has become very expensive, exceeding \$1000 per acre for irrigated pasture. This is complicated by the fact that ground water levels in the Surprise Valley appear to be dropping, making water for pasture land a decreasing resource. The water table problems may effectively put an end to dramatically increasing forage production for a majority of the study area operators.
6. Chapter 4 has been rewritten to include a more detailed description of the criteria applying to vegetative manipulation.
7. See Response to letter from Defenders of Wildlife.
8. Although the failure of good/excellent goal to be met is not a function of increased horse numbers, we have eliminated horses from Alternative 2.
9. Loan programs, such as Farmers Home Administration loans, are not under the control of BLM and such funds cannot be committed by BLM. In

Comment

Response

general, these programs are available to farmers and ranchers to improve the productivity of their private properties regardless of the action taken with respect to public land grazing. To construe these loans as mitigation is somewhat misleading when in fact they could be used to increase a ranch's productivity rather than compensate for the loss of public land forage if no forage reductions were made by BLM. Therefore, these programs fail the definitional tests of mitigation.

10. The monitoring system proposed in Alternative 4 would be the same monitoring system detailed in the Proposed Action. All grazing management alternatives would involve the same level of monitoring.
11. A comprehensive monitoring system has been developed, approved and is currently being implemented for the Tulead/Home Camp Study Area immediately south of Cowhead/Massacre. This system was finalized after extensive review and comment from the BLM staff and the extension and university personnel of California and Nevada.
12. Alternative 7 proposes seeding and spraying on 100,500 acres and burning on 21,500 acres. This would amount to treatment of 11 percent of the study area. The reason treatment is considered is not a biological one, but rather one of economics. The concept of multiple-use does not imply that all uses must be provided on every acre of ground, but rather that a mosaic of uses be developed for an area. Treatment of significant areas for livestock forage does not necessarily create inconsistency with multiple-use, but rather develops a different mosaic of uses.
13. The initial stocking rate (Year 1) for Alternative 7 would be determined as in the Proposed Action (See pg. 8-89). In subsequent years forage would be allocated so that utilization restrictions would not be violated. Cultural treatment development would be initiated on Year 1, but the benefits of increased forage to the operator would not be useable for at least 2 years. The important feature of the alternative is that utilization levels would be the determining factor for stocking each year so the carrying capacity would not be exceeded in any year.



California Wilderness Coalition

POST OFFICE BOX 429 • DAVIS, CALIFORNIA 95616 • (916) 758-0380

April 10, 1980

LOCAL OFFICE OF

RECEIVED

District Manager
Bureau of Land Management
P.O. Box 1090
Susanville, CA 96130

BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

Dear District Manager:

We wish to offer the following brief comments on the draft environmental impact statement for the Proposed Grazing Management for the Cowhead/Massacre Planning Units.

First, we strongly support the proposed reduction of grazing levels from the present 59,924 AUM to 29,711 AUM. This action will benefit all aspects of the environment and human use thereof except for short-term economic impacts on livestock operators. Even the economic benefits of livestock grazing will increase over time as the quality of the range improves from the present degraded conditions.

We also very strongly support the proposed elimination of livestock grazing and off-road vehicle use in the High Rock Sub-Unit. The benefits to wildlife, natural vegetation assemblages and primitive recreation opportunities will be outstanding. We further applaud the proposed elimination of all wild horses and burros in this area. This action will be necessary for bighorn reintroduction, which we recommend be undertaken as soon as biologically feasible. We recommend that this area be proposed for wilderness designation as a further means of protecting environmental quality and recreational opportunities.

We have the following suggestions for improvements in the final action and final EIS:

- (1) Livestock grazing should be eliminated from all riparian areas as they supply extremely valuable wildlife habitat.
- (2) Provisions of Alternative 8 ("Optimized Non-Consumptive Use") should be adopted to reduce livestock-wildlife conflicts.
- (3) All wild horses and burros should be removed. They are exotic species presenting no economic benefit and destructive to native vegetation and wildlife.
- (4) No plowing and seeding should be allowed on the public lands--extremely negative impacts to native plant communities and wildlife habitat would result from such action.
- (5) All grazing levels should be monitored and reduced if necessary to prevent erosion or long-term changes in natural vegetative composition, or any other adverse environmental impacts.

We are extremely supportive of the Susanville District's proposal to implement management of these lands in favor of environmental quality and the best public interest as an alternative to non-management in response to demands of a single user group--livestock operators. The benefits of this action will be far-reaching. Thank you for considering our comments.

Sincerely,

Dennis Coules
Dennis Coules

Project Coordinator

Comment

Response

1. The suggestion to remove all wild horses and burros would be in violation of the Wild and Free Roaming Horse and Burro Act and Bureau policy.



Wildlife Management Institute

709 Wire Building, 1000 Vermont Ave., N.W., Washington, D.C. 20005 • 202 / 347-1774

DANIEL A. POOLE
President

L. R. JAHN
Vice-President

L. L. WILLIAMSON
Secretary

JACK S. PARKER
Board Chairman

April 7, 1980

Dept. of Interior
RECEIVED

**BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA**

District Manager
Bureau of Land Management
P. O. Box 1090
Susanville, California 96130

Dear Sir:

The Wildlife Management Institute is pleased to comment on DRAFT ENVIRONMENTAL STATEMENT, PROPOSED LIVESTOCK GRAZING MANAGEMENT, COWHEAD-MASSACRE PLANNING UNIT, Nevada.

The proposed plan is one of the better BLM plans we have examined for wildlife. The general improvements are good and we urge prompt implementation of the plan.

1 | A separate section, or sections, on Riparian Management and Mitigation is needed. Riparian discussions are scattered and difficult to locate. It is difficult to make an overall assessment of effects. An easily identifiable section is needed. Riparian systems are a major controversial issue. More information is needed than that given on page 2-27. On page 5-2, we cannot agree with allowing a decreasing wildlife value on Riparian systems on Eight, Nine, Ten and Eleven Mile Creeks. The plan should be changed to improve these and all other Riparian systems.

The priority for resolving resource management conflicts (p. 1-4) is very good.

2 | Table 1-11 (1) Wildlife - (1) Conflict Resolution. What does this mean? It mentions 2-year rest was accepted, but later a grazing season is recommended. Which will it be?

3 | Page xxi. Should not the objective be to improve the basic resources? Not, as stated, to "complement the various activities."

These remarks have been coordinated with William B. Morse, the Institute's Western Representative.

Sincerely,

Daniel A. Poole
President

DAP:lbb

Comment

Response

1. Treatment of riparian areas has been added to mitigation in Chapter 4. Page 52 has been revised to more accurately reflect the ephemeral nature of Eight, Nine, Ten and Eleven Mile Creeks. In addition to being dry most years, only very short scattered sections of the streams are on public lands.
2. Two years rest and later grazing system proposals are not mutually exclusive. The section of the table to which you refer recommends that the area be grazed later in the year with light utilization limits in order to improve forb and bitterbrush quality. This late season light use should then be followed by two years of complete rest before it is again grazed late season with light utilization limits.
3. The objective on page xxi is not to "complement the various activities." The objective is to "improve range conditions" in a manner which complements other activities." The term "range condition" also includes wildlife habitat, watershed and other values.

Defenders OF WILDLIFE

April 30, 1980

C. Rex Cleary
District Manager
Bureau of Land Management
P.O. Box 1090
Susanville, CA 96130

Dept. of Interior
RECEIVED
MAY 5 1980
BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

Dear Mr. Cleary:

Defenders of Wildlife has a long-standing interest in the BLM's range management programs and their affects on wildlife and habitat values. With this in mind, we submit the following comments on the Draft Environmental Impact Statement for livestock grazing management within the Cowhead/Massacre Planning Units of your Susanville District.

At the outset, we strongly support and applaud the proposed action to reduce overall grazing levels from the current 59,924 AUMs to 29,711 AUMs. The DEIS amply documents and demonstrates the desirability of this reduction. This proposed grazing reduction is also fully consistent with--indeed, compelled by--the Federal Land Policy and Management Act and other relevant laws and policies. For these and other reasons, we trust that this reduction will remain--without significant change or weakening--in the Final Environmental Impact Statement and be rapidly implemented.

In addition, we would like to commend those who prepared the DEIS for its concise, understandable, and comprehensive treatment of the data. We are especially pleased with the candid and clear presentation of proposed actions, relative trade-offs, and the reasoning involved. It is refreshing to note as well that while past DEISs too often appeared to accept grazing as a dominant use of public lands, this one is far more in line with a genuine multiple use ethic by acknowledging grazing as but one of many equally important uses of these lands.

Moving from general to specific comments, perhaps the most significant issue to address is the foreseeable "realities" of implementing the laudable proposed action. While these grazing reductions and other adjustments would benefit a broad array of public values and ensure compliance with relevant legal obligations, they would pose short-term socio-economic difficulties. Even the knowledge that these actions would significantly increase the land's productivity in the future does not diminish these concerns for immediate disruptions. The answer, of course, cannot be to blindly continue the status quo, ignore festering problems, and hope for the best. Instead, public funds and other governmental assistance--as outlined in Alternative 3--is a prudent course to follow in attempting to ease any socio-

C. Rex Cleary
District Manager
April 30, 1980
Page-2

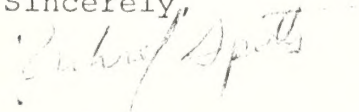
economic hardships. Some livestock interests reject or condemn these good faith offers of assistance. Apparently they oppose any overt public subsidies, preferring to continue the present "hidden" subsidies of using public lands at a rate which demonstrably reduces their long-term productivity and their potential range of uses for other public benefits. But since the overwhelming weight of law and public opinion is against the continuation of these "hidden" subsidies which have made grazing a dominant use of many public lands, the solution must ultimately lie in persuading affected parties to accept public assistance to tide them over.

On a related matter, it is obvious that multiple-use and sustained yield principles do not mean that all or most public uses can or should occur simultaneously on all parcels of public land. The specific resource capabilities, needs, and sensitive values are acknowledged. For example, critical wildlife habitats or areas of outstanding or fragile natural values are afforded special protection. This is simply a function of science, law, and common sense. On this basis, we vigorously support the proposed elimination of grazing and off-road vehicle use in the magnificent High Rock Sub-Unit. This Sub-Unit deserves maximum protection to optimize extant values as well as to foster prospective benefits such as bighorn sheep reintroduction and primitive recreation. Wilderness status would appear to be appropriate in this context.

1 | Finally, we believe that grazing should be eliminated from contact with all riparian areas consistent with relevant BLM guidelines, and the final EIS should precisely describe "Areas of Critical Environmental Concern" and reconcile their specific values with their recommended fate under the alternatives.

Thank you very much for considering our views.

Sincerely,



Richard Spotts
California Field Representative
Defenders of Wildlife

6330 Havenside Drive, #5
Sacramento, CA 95831
(916) 393-6938

RS/bc

Comment

Response

1. At this time guidelines for Area of Critical Environmental Concern (ACEC) are still in preparation. As these guidelines are implemented ACEC's will be identified and activity plans developed or modified to protect and enhance these areas.

SIERRA CLUB

LEGISLATIVE REPRESENTATIVE

1107 Ninth Street
Forum Building, Room 405
Sacramento, California 95814
(916) 444-6906

by Ansel Adams

March 5, 1980

Dept. of Interior
RECEIVED
MAY 5 1980
BUREAU OF LAND
MANAGEMENT
SACRAMENTO, CALIFORNIA

Rex Cleary, District Manager
Bureau of Land Management
P.O. Box 1090
Susanville, CA 96130

COMMENTS ON PROPOSED LIVESTOCK GRAZING MANAGEMENT FOR THE COWHEAD-MASSACRE PLANNING UNIT DRAFT ENVIRONMENTAL IMPACT STATEMENT

Dear Rex,

I am submitting these comments in my capacity as the California-Nevada Field Representative of the Sierra Club. The Sierra Club is a conservation organization with 180,000 members, more than 45,000 of whom live in northern California or Nevada.

I want to preface my comments by again expressing my thanks to you, Dean Swickard, and Lee Delaney, for the effort you went to to involve me and other interested parties in the planning process for Cowhead-Massacre. I greatly appreciated the opportunity to learn about the area and the problems of managing it from the people who know it best--the BLM area staff and the local grazing permittees. Though the public involvement process did not succeed in accomplishing all that everyone expected from it (those expectations were very high considering the innovative, experimental nature of that effort) it still stands out to me as one of the bright spots in all of the Bureau's planning efforts of the past 4 years.

COMMENTS ON THE DEIS

The Cowhead-Massacre DEIS is a vast improvement in every way over the Tulead-Horn Camp EIS done by the Susanville District in 1978. It is well-written and thus understandable; it is not cluttered up with irrelevant information; it is straightforward in its presentation of proposed actions; and it is explicit in relating the proposed action to management goals as expressed in the Management Framework Plan. Regardless of how one feels about the proposed plan, everyone who has read the Tulead-Horn Camp or other planning EISs should agree that the Cowhead-Massacre DEIS deserves high praise for its presentation.

A number of editorial improvements could be made in the

organization of the EIS, but since I understand that the final EIS will be in the nature of a supplement rather than a complete document, I will forgo those comments at this time.

I did find the environmental analysis of alternatives 6 and 7 to be lacking in detail--both about the specific nature of these alternative actions and about the projected impacts. I was very interested in these alternatives because of the apparent conjunction of significant improvement in range condition with minimum economic impact.

I wish to request that the explanation and analysis of these alternatives be significantly expanded, particularly in regard to the following points:

1 | --What is the relationship of Alternative 6 to the Fish and Wildlife Service's planning for the Sheldon Wildlife Refuge? What makes "the viability of this alternative depend on the management plan for the Sheldon" (3-61)?

2 | --Alternative 6, with "little or no change in present allotment boundaries, seasons of use, or stocking rates" (3-61) promises that "range condition will improve on most of the area" (3-61) but the analysis of Alternative 1--Continue Present Management--indicates that "vegetation on most of the area would remain unchanged" (3-1)?

This is misleading, and more information should be presented on how Alternative 6 differs in its impacts from the proposed action. Some of this is accomplished in summary table 9, but without explanation of methodology or citation of authorities.

3 | --A closely related issue is that of the relative merits of the alternative methodologies for determining stocking rates in the proposed action and Alternative 7. This is one of the more important issues of management philosophy and method in the EIS, and it deserves specific treatment in the text, complete with references to research and specific cases in the Great Basin. I think there are some good reasons for preferring the methodology used in the proposed alternative, and would like to see them laid out for the public.

4 | Another topic which has not gotten the treatment it deserves in the DEIS is a clear presentation of why current range conditions in the Cowhead-Massacre unit are not satisfactory. I may agree with BLM staff that the statement that "most of the area is in poor/fair ecological range condition" (xxi) implies a dire need for improvement, but I found that many of permittees were not (at least initially) willing to accept that current conditions were unacceptable.

5 | I also believe that more detailed treatment is needed of the social-economic impacts of Alternative 1--Continue Present Management. All the economic predictions for the other alternatives really have little meaning without a clear baseline to compare them to--that of where the area is headed now. There

also should be analysis of the proposed cuts in relation to actual as well as licensed use.

6 | The DEIS economic data is deficient in three other respects. First, it lacks a cost-benefit analysis of proposed range development and vegetative manipulation. Exact specifics are not necessary to display cost-benefit approximations based on the scale of improvements in each alternative. Second, agency personnel requirements should be quantified for each alternative. Third, there is no analysis of the impact of reductions (if any) on ranchers' credit.

7 | The treatment of Wilderness and its interaction with proposed range developments is inadequate. The Bureau now has a Wilderness Study Area management policy which should make such evaluation possible, and it should be done as soon as possible to prevent unnecessary confusion or delay.

8 | The complete lack of attention to the matter of Areas of Critical Environmental Concern--especially where grazing or related activities might be the source of the threat to a critical environmental resource--will have to be corrected. Section 202 of FLPMA, relevant to land-use planning, directs the Bureau to "give priority to the designation and protection of ACECs."

9 | Another important detail lacking from all the alternatives is a presentation of what monitoring of condition and trend will be done, and how it will be done--its method, timing, recordation, etc.. This is a crucial element of any plan selected by the BLM. Without it there is no way of verifying progress toward basic plan goals, no way to quantify adjustments that may be needed, and no way to quantify increased forage production so that parts of it can be allocated to livestock or other uses.

Without a clear monitoring plan, the plan and its future lack all credibility.

COMMENTS ON THE PROPOSED PLAN AND ALTERNATIVES

The Sierra Club strongly supports the proposed action presented in the DEIS. We feel this innovative proposal fits the legislative mandates of the Federal Land Policy and Management Act and the Public Rangelands Improvement Act far better than any of the alternatives.

In FRIA, Congress explicitly declares that many public rangelands are in unsatisfactory condition, establishes a national policy and commitment to improve the condition of the public rangelands, and requires the Secretary of the Interior to manage public rangelands "to become as productive as feasible in accordance with the rangeland management objectives established through the land use planning process."

Summary Table 9 in the DEIS clearly establishes that the proposed plan of action accomplishes this far better than any of the other alternatives, with the exception of Alternative 8 (and

Alternative 3, which is identical to the proposed action in terms of land-use).

The proposed alternative also best exemplifies the definition of "multiple-use" which FLPMA mandates BLM to follow--"a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including recreation, range, timber, minerals, watershed, wildlife and fish, and natural, scenic, scientific, and historical values." The diversity of the proposal's benefits separates it from all the other alternatives. It is an impressive multiple-use and multiple-resource plan.

On the basis of Summary Table 9 it is clear that Alternatives 1 and 4 clearly do not meet these basic mandates for positive planning toward improved range condition, and multiple-use. Weighting improvement in range condition more heavily than other planning goals--as we believe is warranted by PRIA and by simple consequence of the basic importance of vegetative condition to all other rangeland values--Alternative 6 is also found to be lacking.

Alternative 3 is the same as the proposal except that it provides for Congressional subsidy to ease economic and (by implication) social impacts of the proposed action. Alternatives 4, 5, 6, and 7 (but especially 4 and 5) seem to try to accomplish this same goal of minimizing economic impact, but they accomplish this by reallocation of resources to livestock grazing and away from other activities and resource values.

This concern for the people and society of Surprise Valley is both valid and necessary, even though the BLM has no legislative direction putting these values on a par with the resource protection and multiple use mandated by FLPMA. I would like to discuss the various approaches toward protection of the existing socio-economic structure of the planning area.

The first point to be made is that BLM does not seem to have adequate information to make rational decisions about how, how much, or even if such support is warranted. The DEIS points out that under current management, annual costs exceed revenues for the region's cow-calf operations. This seems to indicate that the truth of the matter is that there is no stability to be disrupted--that the public land-dependent rancher in this area has no future. He can only hold on as long as his equity allows.

This scenario clearly means that major adjustments are needed for survival of locally owned ranch operations. A cash subsidy would not improve this situation. The Sierra Club is concerned about the quality of life for residents in this area, and supports federal efforts to improve or stabilize that quality of life. But cash payments would seem to be, in this case, subsidies for individuals rather than subsidies for ranching or a ranching lifestyle.

Actions that would truly stabilize or improve the situation of the local rancher include:

--First and foremost, improved range conditions. Better

performance, and particularly heavier calves, seem to be the key to improving profitability of these operations.

--Aid for capital improvements, particularly for pasture irrigation or other means to increase forage production on private lands.

--Information and aid in adjusting to new land-management mandates and harsh economic times. Extension agents are a traditional vector for such aid. They need Bureau support in exploring and supporting innovative approaches to new management systems, such as the winter grazing regime suggested by Paul Zwerman, and the calculations on the benefits of irrigation development by Arnold Bullock, which appeared in adjacent articles in *Rangelands*, October, 1979. Both these articles suggested range management alternatives directly applicable to the Cowhead-Massacre area. Neither is referenced or used in the DEIS. Both should have been.

Through the Stewardship program, BLM should actively support operators willing to experiment to test new, non-traditional practices that might increase productivity.

Questions of alternative allocations are more difficult to handle. It is much more difficult to decide when an allocation takes so much from some uses and resource values for the benefit of another--such as livestock grazing--that it amounts to an unjustifiable subsidy.

Alternatives 4 and 5 clearly violate any sense of balance. Alternative 4 is totally unacceptable because of its total lack of action to accomplish needed range improvement. Its premise--that no changes can be made until information is gathered through monitoring--is inconsistent, in that it ignores the mass of information already gathered by BLM over the past three years, indicating unsatisfactory range condition, largely static or downward trend, and deterioration of riparian zones and other key habitat types.

This alternative is short-sighted, to the point of dooming locally-owned ranching in the area. The fact is that the figures show that the status quo is a position of increasing financial weakness for local ranchers. Their willingness to settle for the status quo is equivalent to resignation to their being the last generation of single-family operators in the region. As sad as it is to all of us, times change. Adaptation could allow the basic institution of the family ranch to survive. Sticking to old ways despite changes in federal land law, the structure of the nation's beef industry and market, and general economic realities, is a sure ticket to destruction.

Alternative 5 is based on an unrealistic and unjustifiable commitment of \$3.6 million to vegetation manipulation and range development. It is unjustifiable because the money goes to the benefit of livestock use without providing substantial return for other multiple-use values. For example, it would provide only minimal improvement in the amount of lands in poor condition.

It is unrealistic because it is very unlikely that the

Congress would appropriate such a large sum for such narrow return. The Sierra Club certainly could not support such an appropriation.

Alternative 1's failure to meet planning goals is clear indication that it, too, is unacceptably unbalanced.

Alternative 2--no grazing--also seems somewhat out of balance, although it does have the positive aspects of meeting many and varied land planning goals at a minimum cost. Despite this, it is clear that some grazing use is compatible with these same goals--as it is in the proposed action--and I believe that the general public does support added expenditures to support grazing uses where grazing on public lands plays a key role in the local social and economic structure.

Alternatives 6 and 7 are more difficult to analyze (partially because of incomplete information--see comments above). Each is, however, clearly inferior to the proposed action in the balance of uses it proposes.

Alternative 6 seems to be based on a lowering of the bottom line--it only makes sense if one considers "fair" range condition to be acceptable. This is clearly inconsistent with the intent of PDIA, as well as with the MFP goals for the area. Similarly, Alternative 6 is not adequate to wildlife needs, particularly in its lack of action to protect riparian and other sensitive critical habitats.

Alternative 7 seems potentially attractive, despite heavy impacts on riparian areas that are probably inconsistent with the BLM's new policy on these areas. The biggest problem I have with evaluating it is the lack of information on how it was analyzed by the EIS team. They credit it with a lot of range improvement potential that I suspect to be optimistic when I compare it with the proposed alternative.

Its heavier livestock concentrations seem to imply to me that poor condition areas are not so likely to improve, and that cultural resources and concentration areas such as water developments will suffer. I am fearful that increased concentrations and many new water developments will result in an increase in overused areas and a decrease in underused (by livestock) areas which may have been of special importance to wildlife. The high construction and maintenance costs of this alternative also weigh against it--and make its complete implementation that much more difficult.

Alternative 8 differs minimally from the proposed action in its impacts, except for the difference in AUMs allotted to livestock. I can support the balance of uses it proposes, but I wish the DEIS had stated a clear rationale for having an alternative so close to the proposed action.

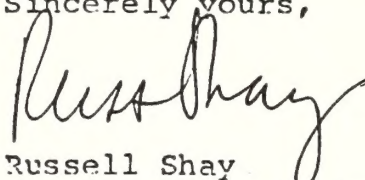
I would like to offer some comments on implementation of a grazing plan in this area. This subject--on which the whole

credibility of BLM rests--did not receive anywhere near the attention it deserves in the DEIS. We have been profoundly disappointed with the lack of action in implementing the Tuleadad-Hore Camp decisions. And before that we were profoundly disappointed in the divergence of the decisions in that area from those proposed in the final EIS. We strongly feel that these actions have greatly compromised the Bureau's credibility with permittees as well as with other participants in the planning process. We feel it is essential that decisions on Cowhead-Massacre are issued simultaneously with the FEIS, that they conform to the proposal analyzed, and that implementation be begun immediately.

Part of that implementation should be a plan to phase in reductions to minimize impacts on the price and availability of alternate forage, and to give cooperative operators who desire time to develop alternate forage sources.

Rex, if you gave me a year I could have written books on this DEIS and its alternative plans. I hope some of what I did manage to put down is of use to you. I am planning to join a group of Sierra Club members to hike in High Rock Canyon in May, and I will try to stop by Susanville to say hello on the way. Thanks again for your help, and for your attention.

Sincerely yours,



Russell Shay
CA-NV Representative
The Sierra Club

cc: Rose Strickland, Johanna Wald, Lee Delaney, Frank Gregg

1. The grazing systems proposed for North Nut Mountain and Wall Canyon would involve seasonal use of both BLM and Fish and Wildlife Service grazing privileges on the same or in different grazing seasons. These grazing systems were created as an effort in Coordinated Resource Management. If the BLM or FWS does not use the Coordinated Resource Management Plan, then the other agency must look for other ways of grazing management on its lands.
2. Alternative 6 proposes significant amounts of cultural treatments to increase livestock carrying capacity and grazing systems to improve range condition and carrying capacity, while Alternative 1 proposes no such changes. While the two alternatives start at the same livestock use levels the grazing management is significantly different. It is important to realize that grazing management is significantly more than how many AUM's were used by livestock.
3. The proposed stocking in Alternative 7 is not significantly different from that proposed in Chapter 1. The major differences occur as a result of livestock being able to use rest pastures for up to 3 years (year 4 of implementation). The purpose was to mitigate economic impacts while still allowing maximal rates of range improvement. In many ways, this method of determining stocking rates approximates the most effective method used on private and public lands. That is, place the number of livestock in a pasture that you hope will be the correct number and observe the results, adjusting as necessary. For all the complex calculations and fudge figures, in the end this method is still the only one that provides the necessary information.
4. Table 2-4 and Appendix C provide the basis for estimates of present range condition. The position of the permittees may be a natural reaction to substantial adverse impacts or could also be based on the general feeling that since the last reductions range conditions have improved. This is partially borne out by the difference between the 1963 survey capacity of 49,675 AUM's and the 1979 measured livestock/horse capacity of 66,838 AUM's.
5. Factors beyond the scope of our data base make increasing the level of economic analysis meaningless. Long term climatic patterns, national and international economic patterns and national demands for meat are impossible to predict at any time.
6. BLM prepares cost-benefit analysis of detailed allotment management plan (AMP's) after the environmental impact statement has been completed and forage allocation decisions have been reached. No cost-benefit analysis is available at this time. The level of agency personnel required has not been included because it is not expected to have environmental impacts.

Comment

Response

The availability of credit to ranchers is a general consideration in the evaluation of ranch viability under each alternative. The critical matter to ranchers is the availability of additional credit which is a function of ranch productivity and past accumulation of debts for both personal and business purposes. Since the level of indebtedness is proprietary information, BLM is unable to address availability of credit in any more meaningful manner.

7. Identified WSA's have been added, along with analysis based upon the present BLM wilderness management policies.
8. See Response #1 to comment by Defenders of Wildlife.
9. The elements of the monitoring system have been expanded in Chapter 1. The same level of monitoring would apply to all Alternatives except 1 and 2. The exact detail of the system could not be finalized until AMP's or activity plans are developed. It is anticipated that most of the methodology would be drawn from the Tuledad/Home Camp Study Area Monitoring System which is currently being implemented.

Rose Strickland

1685 KINGS ROW, RENO, NV 89503

April 14, 1980

C. Rex Cleary
District Manager
Bureau of Land Management
P.O. Box 1090
Susanville, California 96130

Dept. of Interior
RECEIVED

APR 16 1980

**BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA**

Dear Manager Cleary,

Thank you for this opportunity to comment on the Proposed Livestock Grazing Management for the Cowhead Massacre Planning Unit. This draft EIS is by far the most innovative yet developed by BLM and shows a tremendous amount of effort on the part of your staff. I only wish that their efforts had resulted in a less lengthy and more readable EIS for the benefit of the reviewer. After many hours of steady reading, comparing of charts and cross-checking of alternatives, I finally reached some conclusions which I hope will be considered in the final EIS.

The proposed action is the most balanced one yet developed by BLM with priority being given to values other than livestock grazing by the Bureau. Archeological and historic resource values of the unique High Rock area are properly recognized and the proposed actions for their management seem appropriate. Likewise, the priority given to wildlife values in the Massacre-Mountain/Nut Mountain Sub-Unit appear correct. Concentrating range improvements and intensive management in the Long Valley/Sand Creek and the Mosquito Sub-Units for the benefit of livestock grazing maximizes the potential for improving range conditions and insures long-term economic survival for ranching operators.

Before I address the limitations of the proposed action, I would like to briefly review the other alternatives which I found to be unsuitable in whole or part.

1. Continue Present Management. The statistics on the deteriorated condition of the range are a shocking reflection on the ineffectiveness of the Bureau's present management, the concentration of the livestock industry on short term economic gains at the expense of the range resource, and the lack of public knowledge or concern about the misuse of the public rangelands. I only hope that each of us can make the whole EIS process and its implementation a pledge of our commitment to responsible use and care of our public lands. This alternative is totally unacceptable.

2. Elimination of Livestock Grazing. This alternative would result in a large increase in forage production at no cost to the public. BLM statistics show that much of the rangeland is so badly deteriorated that it will not be able to restore itself even with the elimination of livestock grazing pressure. Some range improvements appear necessary and some livestock grazing can be accomodated on public lands. The question really is "how much of both."

3. Proposed Action With Economic Adjustments. The public has been subsidizing the livestock industry indirectly for many years by allowing the overuse of the public rangelands. This more direct subsidy is more forthright, but equally unacceptable to me. There is no provision in FLPMA or the NRDC suit which gives BLM the authority to preserve small ranching as a way of life no matter how worthy a goal this may be. Due to the operations of the capitalistic market system, other small businesses such as small farms and family-owned grocery stores with equal value to local communities are disappearing. Unless a national commitment is made to preserve all small businesses, I do not feel the government should preserve marginal or over-extended ranch operations.

4. Rancher Developed Progressive Range Improvement. I regret that I was unable to read the illegible copy of Alternative 4. The BLM version of this alternative was neither progressive nor offered much of an improvement to the range. This alternative appears to recommend ignoring all available data in lieu of establishing an extensive, expensive monitoring system which is unlikely ever to materialize, therefore permanently delaying any reduction in grazing allotments, changes in season-of-use or BLM prescribed grazing systems. It would result in the least increase in forage production, second only to NO action. This alternative may be a reflection of the livestock operators' intense desire that nothing change or of their resistance to proposed implementation of intensive range management by BLM. Neither hope nor fear is great enough to warrant continued destruction of our public land resources. This backward alternative is not acceptable.

5. Extensive Cultural Treatment. This alternative is a good example of throwing money at the problem to make it disappear. Even with a commitment of \$36 per AUM or \$108,788 per permittee, the improvement in forage production is substantially less than the proposed action with subsidy. Range conditions would show little improvement. A cost-benefit analysis would lead to the rejection of this unfeasible alternative even if its deleterious effects on wildlife could be overlooked.

1 | 6. Grazing Systems. While much range in poor condition would be reduced by this alternative, range in fair condition stays the same. The range "improvements" result from an imbalance of range management. While a large amount of money is spent for range improvements, there is no corresponding change in grazing numbers and little change in season-of-use. The worst part of the alternative is the continued deterioration of sensitive areas "since there will be no fencing around meadows, aspen stands, and riparian areas." Any benefit from this alternative is limited by the inherent flaws of failure to adjust stocking rates and protect the areas subject to greatest abuse.

2 | 7. Alternative Method for Determining Stocking Levels. This expensive alternative does little to improve range conditions. Although it appears to increase forage production, I felt the increase was simply a result of number-juggling since range conditions did not substantially improve. Increasing forage for livestock instead of improving range conditions is not acceptable.

3 | 8. Optimized Non-Consumptive Use. I do not understand why this is a separate alternative as its difference from the proposed action seems negligible.

4 | In summary, there are certainly a lot of alternatives to consider in this EIS. While previous EISs had alternatives which were apparently designed to make the proposed action look good, this EIS seems to have developed alternatives to emasculate the preferred action. In none of them were there significant improvements in any of the resource areas to justify any more than slight modifications of the proposed action. Most alternatives were wholly unacceptable.

The problems with the proposed action do not lie in the plan but in its unlikely implementation. BLM cannot propose a 50% reduction in grazing allotments and expect the livestock operators to accept BLM decisions or rationale. Therefore, we can see in alternative 4 operator denial of poor range conditions and effectiveness of basic range management methods such as changes in season-of-use.

5 | BLM cannot expect to change from no-management to optimal management overnight. Legislation limiting grazing reductions to no more than 10% per year has already gone into effect. Taken with the fact that most operators in Cowhead-Massacre have 30-40% non-use of their leases (Table 2-9), no reductions will be felt on the land until the 4th or 5th year anyway. This congressional event changes all the calculations for increased forage production and also increased livestock use.

Grazing reductions appear to be tied to grazing improvements. Unless funds are forthcoming, therefore, nothing will change on the land. Since funds for range improvements are subject to annual budgets in a decade of balancing budgets and reducing taxes, the likelihood of adequate funding appears doubtful.

I believe that the proposed action was carefully and responsibly thought through. The result is an excellent plan. The implementation, however, was inadequately treated. A workable implementation plan must be addressed at the EIS level or subsequent implementation efforts are doomed to failure. This would only benefit those who want nothing to change. It would inevitably lead to further range deterioration.

6 | I suggest that the final EIS include a section on priorities for range improvement funds, schedules for tying in necessary grazing reductions, a schedule for phasing in reductions and changes in projections of forage production, and range improvements due to the 10% per year limitation. Changes in the High Rock and the Massacre Mountain/Nut Mountain Sub-Units should proceed as soon as possible and not be tied to completion of any range improvements.

None of us can afford to condone or participate in the continued deterioration of our public lands. Irreplaceable values such as archeological and historic resources and wilderness are being lost forever. The ability of the lands to heal much of the damage from mis-use and overuse is being limited by our delays and excuses. Much of the lands in Cowlead-Massacre need our help to recover their optimal condition. Let's get on with the job.

Sincerely,

Rose Strickland
Rose Strickland

Comment

Response

1. Alternative 6 has been modified to include protection for sensitive habitats.
2. Summary Table 9 indicates substantial range improvement (360,000 acres in good condition in 20 years). Analysis in the alternative indicates that increasing livestock forage and improving range conditions are not incompatible.
3. Alternative 8 was analyzed to provide the decision maker with a proposal with stocking rates lower than those developed for the Proposed Action.
4. Several of the Alternatives provide for significant improvement as is indicated in Summary Table 9. Alternatives 5, 6, and 7 would provide improvement to most resource values. While improvements are not as great as the Proposed Action or Alternatives 2, 3, or 8 the analysis shows that the statement "In none of them were there significant improvements in any of the resource areas . . . " (emphasis added) is clearly not an accurate reflection of the DES.
5. Your interpretation of Table 2-9 is unclear. Nonuse in the study area averages only a few percent per year. No operators in the study area take 30-40% nonuse for more than one season. Reductions to be imposed would be felt the first year of implementation. It is Bureau policy that the 10% limitation will be applied to the previous years use or 5 year average, whichever is greater.
6. The reduction limitation you mention (the McClure Amendment) is in effect for the 1980 fiscal year. Whether or not it will be continued in the future is beyond the scope of this analysis. In any event, the limitation applied only to reductions in appeal status and only until the status of the appeal has been settled by the hearing officer. Thus, the actual impact of the 10% limitation on implementation could be subject to many differing interpretations of equal merit. The selection of one of these interpretations and subsequent addition to the final EIS would thus serve little purpose. The subject of implementation will be addressed as the specific management plans are developed for each area.

National Wildlife Federation

232 Court Street
Reno, NV 89501
April 14, 1980

Dept. of Interior

RECEIVED

Mr. Rex Cleary, District Manager
Bureau of Land Management
P. O. Box 1090
Susanville, CA 96130

**BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA**

Dear Mr. Cleary:

The Cowhead-Massacre Planning Unit Draft Environmental Impact Statement proposed action does reflect the mandates of the Federal Land Policy and Management Act of 1976 and related Acts and regulations. We recognize the EIS to be a planning function as one of the various steps leading to a final decision document before implementation proceeds.

It is our impression that certain events now under development such as the establishment of the Modoc/Washoe Experimental Stewardship Program (43 U.S.C. 1901, Section 12) and current revisions of a BLM Rangeland Management Policy document may have some influence on the final outcome of the Cowhead-Massacre Planning Unit,

Further, it is our impression that neither the Stewardship Program or a revised BLM Rangeland Management Policy can substantially revise or alter the facts contained in the EIS, nor can these programs change considerably the proposed action considered to be appropriate in the final EIS statement. To do so would be countermand to the directive of the Courts which call for the EIS.

The influence that may come about from the Stewardship Program and the revised BLM Rangeland Management Policy would be in the method of implementation of the proposed action and not in altering the final decision document, which must be based upon the EIS.

1 Alternat^{ive} 3 (page 8-17) Proposed Action with Economic Adjustments, is one that deserves further study. We suggest that more economic data be obtained to develop a clear picture. Costs to respond to a possible appeals procedure, court action or both, as well as increased costs for needed range rehabilitation at a later date due to a possible delay in implementing the proposed action should be examined. This should be compared to the costs of an initial economic adjustment and immediate implementation of the proposed action without the added costs of delaying actions.

There are other economic considerations which have not been made clear. Albiet complicated, costs to plow and seed 21,000 acres as called for in the proposal and the \$2,405,000 esimated for

1 range facilities for Alternate 7 should be examined and translated into some kind of cost benefit comparison to enable a taxpayer to understand how he may be obtaining value received. Extensive cultural treatments to increase forage production for livestock may or may not make it possible to increase wildlife populations elsewhere in the unit and on the treatment sites considerable irreplaceable wildlife losses can occur. If there is any way to approach an examination of the gains and losses for all of the multiple uses it might serve as an excellent guideline to use in figuring or determining rationale for cultural treatments.

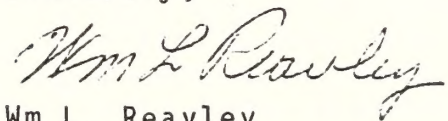
We support suggestions to reduce or remove some wild horse herds in favor of designating favorable areas where these animals can be managed properly in consort with other uses of the range.

The High Rock Complex proposed action which calls for the removal of livestock grazing and wild horses for another important combination of uses certainly serves as an excellent example of multiple use planning and management as directed by the Federal Land Policy and Management Act of 1976. We heartily endorse not only the concept but the specific recommendations for the High Rock sub-unit.

Over all, the Cowhead-Massacre Planning Unit Draft Environmental Impact Statement is a well balanced document that comes to grips with the problems of the area and presents a realistic approach for management. We sincerely hope that the Stewardship Program and possibly other programs will ease the painful problem of implementation. You may be assured that National Wildlife Federation will endeavour to help make the implementation become a reality.

Thank you for the privilege of allowing me to make these remarks.

Sincerely,



Wm L. Reavley
Public Lands Consultant

Comment

Response

1. The additional analysis asked for in this comment would be highly speculative at best. In most cases one could not predict possible appeal procedure, court action or implementation delays with a reasonable degree of accuracy. Most of the specific economic details and comparisons will be covered in the decision documents rationale and activity plan.

REAL ESTATE
INVESTMENTS

*CH
comm
JTB*

KEN H. EARP INVESTMENT CO.

805 FLETCHER LANE
HAYWARD, CALIFORNIA 94544
PHONE 886-3800

April 25, 1980

United States Dept. of the Interior
Bureau of Land Management
P.O. Box 460
Cedarville, California

RANCHE
DEVELOPMENT

DEPT. OF INTERIOR

RECEIVED

MAY 5

BUREAU OF LAND
MANAGEMENT
CEDARVILLE, CALIFORNIA

Re: Meeting held at your office
or 4/2/80, regarding Little
High Rock & Massacre Allotment

Gentlemen:

1 | At this meeting with Mr. Delaney, Rick Cooper and other Bureau of Land Management employees, there were discussions regarding the Bureau of Land Managements intention to remove grazing from within the canyon areas from Little High Rock and Big High Rock Canyons, because of archaeological findings. It seems that you are concerned about whether domestic animals would depress an archaeological artifact deeper into the soil around damp or wet areas, so as to destroy the time frame for which it may be connected to. Yet at the same time you intend to bring in other wild animals that would be able to do the same.

In all of the years that the area has been grazed, upto and including now, it doesn't seem to have materially destroyed any archaeological findings. It therefore seems unfruitful to implement such an action that solely harms the allottee, who is the only user of the area that is charged a fee. Further, it must be stated that the fencing of such areas will serve only to point them out, so that persons who otherwise would not know that such artifacts existed on that location, would be able to readily locate the areas and therefore remove the findings on a much greater scale. It seems proper that the area should remain in its present state.

As for the adjustment of boundaries discussed, it seems that nothing would be gained, other than federal intervention and monies spent to promote the aforementioned improper actions.

2 | The potential for big horn sheep implanting in the area seems to try to force a wild life domain in an area that now does not exist, why not introduce the area with big horn sheep and see for sure whether they are compatible of the present use before destroying the economic base that now is partially supported by livestock grazing in the area. It has not been proven that any disease as mentioned by you has been carried by livestock, would be anymore of a detriment to big horn sheep than say vice versa.

United States Dept. of the Interior
Bureau of Land Management
Page Two
April 25, 1980

3 I strongly protest the area being set aside as wilderness area which would, if approved, limit greatly the number of users for the area.

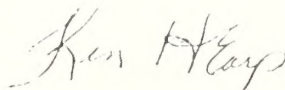
3 The reductions of AUM grazing privileges since approximately 43% would be disastrous to my economic situation and serve no purpose other than, again, spending federal funds for new fencing and limiting the amount of funds received annually by the payment of fees by the only user that is charged a fee, the Livestock man.

4 Your mentioning of extending the turnout time in the spring, approximately 2 weeks to 30 days, is again unfair and extremely costly to the only licensed user. We generally do not graze an area until it is ready and do not need you to point out the specific arbitrary dates that cause us additional cost and is another precedent setting change that you hopefully will eliminate the livestock man from the range.

5 To summarize in our opinion it would best serve the total public if you were to cease some of the expensive methods planned by you to remove approximately 43% of my grazing privileges in the next few years. Why not sit down with me and work out a program that will increase the productivity of the range and increase the funds paid for the use of the range instead of limiting and perhaps lessen its productivity. There are numerous water-hole projects that need immediate attention, there are seedings that need to be done that would enhance the area and of course many other improvements that would be beneficial to the public as well as the user.

Thank you for your consideration.

Very truly yours,



Kenneth H. Earp
805 Fletcher Lane
Hayward, California 94544

Comment

Response

1. The general impacts to archaeology as a result of grazing were discussed at the April 2, 1980 meeting. However, specific impacts were analyzed in great detail in Chapter 3. The impacts in Chapter 3 would also answer your question in regards to impacts of introduced bighorn sheep on these same sites.
2. The primary concern for disease transmission to bighorn sheep is from domestic sheep. Cattle and bighorn may be able to coexist in many areas, although it has been documented that cattle can be carriers of bluetongue without showing any symptoms. Also see comment response to Bob Bunyard.
3. The three Wilderness Study areas in the Massacre Mtn. and Little High Rock Allotments will be inventoried extensively to determine if they should be designated Wilderness. Should the BLM process propose these areas as Wilderness, they will then have to be approved by Congress.
4. The turnout dates which you mentioned as being arbitrary are well analyzed in Chapter 3 and in several of the alternatives in Chapter 8. The analysis showed later turnout dates to be highly beneficial for vegetation. The intent of later turnout dates is not the elimination of livestock from the range but rather the improvement of range conditions.
5. The Bureau of Land Management will make every effort to develop grazing management plans with the livestock permittees. Both livestock needs and resource needs will be taken into account while developing these plans.

SCHADLER RANCH, INC.
Box 23
ADEL, OREGON 97620

April 30, 1980

Rex Cleary, District Manager
Bureau of Land Management
Susanville, California

Dear Mr. Cleary:

The following points are in comment to the Cowhead/Massacre Draft Environmental Impact Statement. Unless otherwise specified, our comments are directed toward the Proposed Action and its alternatives for Sub Unit 4 - Mosquito, Areas A and C.

1 The Proposed Action calls for a May 15 to September 30 grazing season for Area A (North Cowhead and Bally Mountain). The North Cowhead allotment is used in conjunction with a U.S. Forest Service Permit on Mt. Bidwell which begins June 26th. It provides early spring feed for cattle coming off an Oregon hay ranch which is under irrigation by May 1st or cattle coming off winter feed on our Cowhead ranch land that becomes summer irrigated pasture for yearlings. In either case, winter feed grounds serve a second purpose of providing feed producing capability of private base land to meet the requirements of the BLM permit itself. Increased hay production to mitigate the altered grazing season, currently 4/15 to 6/30, is impossible due to this dual use of the private land. Perhaps since this allotment is used only for two months of early feed and the cattle numbers are fairly low, the utilization is actually light. Light use could provide for sufficient regrowth and plant vigor with cattle distribution techniques, such as small scattered water projects and salting methods.

2 The same grazing season is recommended for Bally Mountain allotment in Area A. This is a much more serious problem. Bally Mountain is 80 - 90% privately owned. It is an integral component in our own management system. It provides the flexibility necessary to practice good stewardship of our federal permit jointly with our private lands. Since most of Bally Mountain is of high elevation, we use very little of it during the early growing season. We would request setting our own season of use, stocking rate and utilization level, following the development of a mutually acceptable monitoring program of the Bally Mountain federal inholdings. We recognize the value of these lands to the year around feed requirements of its resident deer herd. However, to ask us to manage these extensive private holdings in a way that gives highest resource value to deer is unfair. It limits our ability to cooperate in other management needs. In layman's language, the fact that important deer browse, bitterbrush, exists on Bally Mountain does not necessarily prove that the bitterbrush is on federal acres. Until the boundaries of private/federal holdings are established and the vegetation on the federal acres is identified, you are in the unsupportable position of recommending a management plan on private lands which may not even apply to the enclosed federal lands. On the positive side, Bally Mountain provides the opportunity to cooperate in enhancing wildlife habitat and in establishing a joint vegetation management system using federal and private lands. We must retain control of the private lands, with the agreement to protect the federal lands, in order to participate in the cooperative effort.

The above mentioned vegetation management plan is part of our proposal for Sub-Unit 4 - Area C. The Proposed Action calls for a four pasture rest system on the Nevada

3 Cowhead allotment. Given the climate and terrain of this allotment, we can not agree with four pasture rest. We do agree with the grazing management system approach and we do agree with early rest on this allotment. Our proposal is the equivalent of a three pasture rest system. We propose dividing this individual allotment roughly in half, resting alternate pastures each year. We would remove the cattle to Bally Mountain mid-season each year, using those fields as feed conditions, cattle classifications and weather indicates the best use to us. This approach allows flexibility, allows monitoring forage, including browse on Bally Mountain, protects the integrity of the private lands, promotes the concept of grazing systems and integrates private and public resources.

4 The other allotments in Area C present a little different problem. The area has one seeding now which provides some early feed. That seeding has potential for moderate expansion. We have identified one or two additional small seeding sites. Seedings could provide two to four weeks annual early feed. The rest of the area could be developed with management system including adequate water development. We already use the Little Valley allotment in conjunction with private land in Mosquito Valley, since Little Valley produces no palatable feed after July 1. The only dependable water sources are our own reservoir and Cottonwood Creek. Again the early feed requirements and plant vigor requirements can be met under cooperative planning which includes water development and brush control.

In general, we want to state our conviction that management benefits all interests. However, rigid adherence to one management scheme, such as Horman, is not applicable to all sites. Secondly, any management proposal must recognize the existing vegetation, aim for the best available in abundance and be cost effective to the forage purchaser and to the taxpaying public. Identifying climax condition plants as the key species, such as Idaho fescue and bluebunch wheatgrass, does not meet those criteria unless they currently exist in the targeted allotment at the 15 to 20% level. In sites containing a lower percentage of the "high succession" plants, we recommend managing for the next best level of succession until the system is established and the trend is definitely upward.

5 Thirdly, we find an inconsistency between the determination of "range condition" and the management plans proposed to address it. As I understand the method used by BLM, range condition was measured by a variation on the SCS forage weight method using canopy cover. Canopy cover on Cowhead/Massacre included sagebrush far in excess of the ideal proportion. Virtually no site in Cowhead/Massacre will constitute "excellent" condition without reducing the brush cover and maintaining that reduced level. Yet every management scheme addresses only forage allocation and consumption. Very few proposed or alternate land treatments include brush control. Those that do are analyzed negatively. Please reconsider this aspect of your approach to improved range condition and management.

6 Fourthly, the district should establish the policy of completing water and treatment projects prior to installing management fences. This would avoid the confusion arising out of simultaneous contracts which are not completed simultaneously. It would also allow us better livestock management practices. Range cattle are animals of habit. They travel the same trails, develop migrational patterns from spring to summer to winter ranges. New fences and altered range are as hard for cattle to adjust to as they are for other range animals. We can decrease short term livestock damages due to range alterations with a minimum of preplanning.

Finally, we are completely opposed to the Proposed Action on Sub - Unit 1 - High Rock. We agree the area is unique and priceless. A wilderness designation limits

its educational, scenic, historic value too severely. The anthropological resource needs protection, we agree. However those sites most under pressure need to be gathered and catalogued rather than locking people out to protect the archeology. The domestic sheep are as much a part of the historical picture of High Rock as the Indian Camps and the Wagon Trail. The historical aspect of the Bunyard Sheep and Erp Cattle should be explored. We are not opposed to a well thought out program of Big Horn Sheep introduction so long as it does not exclude the domestic livestock. There are at least five introduced bands of Big Horn within a two hundred mile radius of High Rock. The domestic range sheep bands are a disappearing phenomenon in the west. It makes little sense to sacrifice two food and fiber producing species from an area in order to provide the habitat for a questionable introduction of wildlife. High Rock provides an opportunity to display not only ecological diversity, but an impressive spectrum of historical/cultural diversity. We challenge you to explore all possibilities instead of embracing a myopic, simplistic management proposal.

Sincerely,

A handwritten signature in cursive script, reading "Lonny Schädler".

Lonny Schädler, President
Schädler Ranch, Inc.

Comment

Response

1. Current utilization levels are not light, but are near the upper end of moderate use (57%). Light use could allow for regrowth if grazing use terminated before soil moisture becomes limiting, April 15 to May 1. We will give consideration to the impacts on later turnouts and maintenance of existing Forest Service grazing privileges in development of BLM/operator grazing plans.
2. We will seek to manage intermingled acres of Federal lands to the highest levels of multiple use/sustained yield with the cooperation of the owner.
3. The proposal corresponds closely to the grazing system proposed for the area in Alternative 7.
4. The ES includes a variety of alternatives emphasizing several types of grazing systems and cultural treatments. The BLM will continue to work with concerned operators in development of management which will satisfy the needs of all resources.

In each AMP or other activity plan the key species to be used will be based upon abundance within the pasture. It is also important to realize that generally the "high succession" plants are the last to mature, and therefore, management designed for their needs will also take care of the needs of earlier maturing plants.

5. The Proposed Action and Alternatives 3, 4, 5, 6, 7, and 8 do consider various types of cultural treatment practices. The revised mitigation guidelines and map show the restrictions to be placed on cultural treatment projects. The analysis of cultural treatment projects in Chapters 3 and 8 were not intended to view negatively, but rather provide an objective impact assessment.

Most of the negative impacts of cultural treatments are mitigated in Chapter 4 and the unavoidable impacts in Chapter 5 are minimal from cultural treatments.

6. The district policy is to develop waters and land treatments before fencing. In most of the proposed and alternative management schemes, the option of herding is available to the livestock operator as an alternative to fencing.

April 18, 1980

RECEIVED

APR 21 1980

BUREAU OF LAND
MANAGEMENT
~~SUSANVILLE, CALIFORNIA~~

Mr. Rex Cleary, District Supervisor
Bureau of Land Management
P.O. Box 1090
Susanville, California 96130

Dear Mr. Cleary,

We are the sons of Anna O'Sullivan, Adel, Oregon, and we wish to make the following comments regarding the Draft Environmental Impact Statement for the Cowhead-Massacre Planning Unit.

First, we would like to offer a historical perspective for the area you are proposing the 42% stocking rate cut. Our mother's ranch at one time ran 385 head of cattle on the Nevada side for six months grazing. Grass, cattle, and wildlife were equal or better than today. Infact, there were considerably more deer and antelope. Also, the turnout date was April 1st in the old days - a much more preferred date to utilize the type of desert range in our mother's allotment. Stock water in April provides for better livestock distribution throughout the entire range.

A 42% stocking rate reduction on our mothers ranch is equal to a 42% reduction in her income. Her income as well as that of the Wolfsen's MC Ranch is spent in our community and most economists conclude that ranch income turns over at least 2½ times before the money leaves the community. Therefore, you can readily see that this 42% cut does infact amount to many dollars.

One can additionally conclude that this 42% stocking rate reduction will have a negative affect on the average american consumer. Less beef raised eventually leads to higher beef prices at the supermarket.

If the trend continues of continually cutting stocking rates on public land areas such as these supposedly studied in this ES, the economy of this region will be adversely affected. This will have far reaching economic affects for all people in the area.

As we read this report (ES), and if your conclusions are correct that Wolfsen's MC will drop the lease on our mother's ranch, then who will lease the ranch? If the MC cannot afford to lease this ranch nobody in the area can.

Even if our mother could lease her ranch her income would drop in relation to your proposed stocking rate cut. In other words one would assume her income would be 42% less. This is our mothers only source of income, and she cannot afford a 42% reduction. This would truely provide her with a hardship.

Our mother has always considered that at sometime one of us (her 5 sons) would eventually take over the ranch. Very frankly, this alternative is a dead issue with a 42% stocking rate reduction.

In conclusion we do not feel that from a historical perspective, from an economic persepective or from our family's perspective is a 42% stocking rate reduction justified. We urge you to consider this when you are making decisions about this issue.

Sincerely,

Michael O'Sullivan

Michael O'Sullivan

Pat O'Sullivan

Pat O'Sullivan

Jerry O'Sullivan

Jerry O'Sullivan

Tim O'Sullivan

Tim O'Sullivan

Dan O'Sullivan

Dan O'Sullivan

Comment

Response

See Response to letter from Anna O'Sullivan.

April 17, 1980

DEPT. OF INTERIOR
RECEIVED

APR 21 1980

**BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA**

Mr. Rex Cleary, District Supervisor
Bureau of Land Management
P.O. Box 1090
Susanville, California 96130

Dear Mr. Cleary:

I wish to make the following comments regarding the Draft Environmental Impact Statement for the Cowhead-Massacre Planning Unit.

1 I would like to preface my comments by stating that I was never made aware of the fact that this study was in process, that the permit I own and lease to the Wolfesen MC Ranch was in jeopardy, and the fact that my entire livelihood was being scrutinized and changes being contemplated. I knew nothing of this so called ES and proposed actions until approximately 10 days ago.

First, I am a widow woman and my only source of income is from the lease of my ranch including my permit to the Wolfesen MC Ranch.

Second, you state in Chapter 3, page 3-73 that "Wolfesen's presently runs 274 head from May 1st to August 31st. The proposal would limit their turnout to 132 head from May 15 to September 30th. If the proposal were adopted, Wolfesen's would find the average cost per cow to use the public lands prohibitive and would probably let their lease on this permit revert to its owner, Anna O'Sullivan of Adel, Oregon."

2 You go on to say in the last paragraph of this same page that "the probable impact of the proposal would see Wolfesen's giving up their lease, and Mrs. O'Sullivan continuing to lease her grazing privileges to other ranchers than returning the ranch to a family - run business."

These two paragraphs I quote are very inconsistent. I wonder who's logic and thinking went into this? In the first place if the average cost per cow for Wolfesen's to run on this land is prohibitive it certainly would be prohibitive for other ranchers as you mention in the last paragraph. Therefore, based on your comments I would be out of business.

Again, in Chapter 8, page 8-132 I quote you as saying "The probable impact of the proposal would see Wolfesen's giving up their lease, and Mrs. O'Sullivan continuing to lease her grazing privileges to other ranchers rather than returning the ranch to a family-run business".

Again, may I ask you if Wolfesen's MC Ranch, with the size and scale of their operation cannot afford to lease my ranch, who can? You are right however about one thing and that is with your proposed stocking rate cut of 42% the ranch could not be returned to a family-run business.

As stated earlier this ranch is my only source of income. I have five sons and my only alternatives for this ranch are to continue leasing it or for one of the boys to assume operation of the ranch. With your 42% cut in stocking rate I don't

2 have much to assume operation of. This proposed cut would jeopardize my well being financially.

I have lived on this ranch 31 years. I would, in closing, offer a few historical comments concerning my ranch and its operation. At one time we had 1920 AUM of public grazing, and now you have us down to 1145 AUM. and you are suggesting an additional cut of 42%. You keep putting the turnout date later and later. I might offer that in my opinion the most suited time to turnout in this country is April 1st. Check with the old-timers in this country - they will tell you the same.

When we had 1920 AUM's, deer and antelope were abundant on our range. You hardly see any today. What does this say for your range management?

In closing may I prevail on you people to reconsider. What you are proposing will definitely be detrimental to me, my family, our community, and all people in general. All we have ever done on my ranch is to raise meat for people to eat.

Sincerely,



Anna O'Sullivan
Adel, Oregon

Comment

Response

1. In order to simplify management of the public lands, it is our policy that we deal with the operator of record, in this case Wolfsen's MC. However, we will make sure that any further actions which deal with your grazing privileges will be brought to your attention.
2. Utilization data collected during the 1979 grazing season have resulted in a change in the Proposed Action stocking rates for the Wolfsen MC permit. The Proposed Action would limit the turnout to 206 head (a 16% reduction). This change in proposed stocking may change the value of the permit to Wolfsen's. The economic analysis on page 3-23 does indicate that the value of these lease permits would probably increase to operators facing large reductions. "It is doubtful that there would be any significant change in the income accruing to the owners of these parcels . . ." (emphasis added).

Rex Cleary, District Supervisor
Bureau of Land Management
P. O. Box 1090
Susanville, California 96130

May 1, 1980

DEPT. OF INTERIOR
RECEIVED
MAY 6

Dear Sir:

It is our feeling the proposed action of Chaparral has failed to consider some very basic facts.

BUREAU OF LAND
MANAGEMENT
CEDARVILLE, CALIFORNIA

In the Little Valley allotment we feel that it has not been overgrazed or abused due to the fact the cattle were in such good condition at gathering time last season, which was an exceptionally dry year. We do feel water improvement would distribute the cattle more evenly. The existing Antelope Spring needs excavating and the reservoir at the south west base of Glenco should be enlarged.

1 The Mosquito allotment has dry feed left over from a three year period. This country has to be used in the early spring because of a water shortage. It is our understanding that there's never been any ELM development of water in this area. We hope to be able to work with the ELM on a share-cost program in developing a existing spring in the upper end of this area and a well and water trough at south end. This should supply ample water for both livestock and wild life.

The Mosquito table bottom terrain lends itself to overgrazing. Brush control is a real necessity on Mosquito Flat to eliminate brush and encourage native grass species to exist and propagate, however we feel the habitat of the sagehen should not be disturbed.

There also needs a reservoir in the Holy Lake allotment at the south west under the rim in order for cattle to use this area. On this allotment the fences are in poor condition.

The summary of this EIS is more water holes would create less concentrated grazing in areas where water is available. This would be most beneficial to deer, antelope and cattle. We feel a plan to give economic stability is utmost important to the community, and this could not be feasibly done by a shorter grazing season or a extensive cut in aum's.

Dept. of Interior

RECEIVED

MAY 5 1980

BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

Respectively,

Wesley Leiminger

Comment

Response

1. Thank you for your comments and suggestions for management of the areas in which you utilize. Your suggestions for water improvements and other range improvement work are needed to develop management plans for the Little Valley, Mosquito, and Holy Lake Allotments.

April 29, 1980

Cedarville, California

Mr. Rex Cleary, District Manager
Bureau of Land Management
Susanville, CA 96130

Re: Response of permittee Robert Bunyard,
Cedarville, California, to the proposed
EIS covering the Cowhead-Massacre Planning
Unit, Modoc County, California and Washoe
County, Nevada relative to sub-units 1 and 2

Dear Sir:

My name is Robert Bunyard. I have a sheep permit in the High Rock sub-unit which is in the southeast corner of the study area. I inherited my ranch operation from my parents and I have a son who is going into the business with me at this time. The Bunyard family has been bona fide producers of livestock on the lands currently under your administrative jurisdiction, along with their predecessors for approximately a hundred years.

(1) I am especially concerned because according to your proposal, my grazing permit will be cancelled and I will be put out of business because you do not propose to attempt to move me to some area other than said sub-unit 1.

1 (2) In the beginning, I am calling your attention to 43 USCA, Section 315 b, which was enacted in 1934 and which has been amended several times by the Congress since then. Since the following language has been reviewed and left to stand the past 46 years, it is obvious that the Congress expected its mandate to be followed. I am setting forth this quotation from that section of the law:

"Except that no permittee complying with the rules and regulations laid down by the Secretary of the Interior shall be denied the renewal of such permit, if such a denial will impair the value of the grazing unit of the permittee, when such unit is pledged as security for any bona fide loan".

If I am to be ejected from my historic place of use, my base property will become valueless and I will have to liquidate my livestock and go out of business. Secondly, my base property and livestock are currently pledged as security for a bona fide loan which loan will run for approximately 15 years.

Mr. Rex Cleary
April 29, 1980
Page 2

2 (2) In the preparation of your EIS covering the Tuledad-Home Camp Management Unit, you made frequent reference to the intermingled acres of private land. I find no direct reference to the private acres in the above EIS. On page xxi, you say that the total area contains 1,094,000 acres of which 769,000 are BLM acres. This leaves 325,000 acres owned by the 34 permittees of which the writer is one. This private land inventory is almost 40 percent of the entire planning unit. Since all of the proposed cuts in the permits of the other 33 permittees are substantial enough to eventually squeeze them out of business, it is obvious that your proposed EIS is designed, amongst other things, to make valueless the 325,000 acres that are in private ownership. I have been unable to find in the Federal Court decision or in the federal statutes to which you refer that such an undertaking is a legitimate activity of your agency at this time.

3 (3) I own 4,200 acres located within sub-unit 2, of High Rock Complex upon most of which there are live springs. Your overall plan to restrict in some areas and exclude livestock grazing in others, is in conflict with the population increase projections in California. The population is expected to jump another ten million within the next ten (10) years. How does the Federal Government, acting through your agency, propose to feed these people?

(4) Every person when born thereafter needs for the rest of his or her life, food, clothing and shelter. My sheep produce both food and fiber and to fiber there can be added for clothing, the leather which my cattle produce. Since God is still making children but has stopped creating land, the Federal Government, by and through your agency, had better stop short and begin to plan for the increased production of livestock upon all of our western federal lands since grass is the universal crop thereof.

4 (5) Since you propose to eliminate all of the livestock and wild horses from the approximate 90,000 acres that make up sub-unit 1, wherein I currently graze, it would appear that you are attempting to establish a single use wildlife refuge. I submit that there is no statutory authority for your agency to do so. The 500,000 acre Sheldon Federal Antelope Refuge which lies to the north and

Mr. Rex Cleary
April 29, 1980
Page 3

east of the tract currently being discussed by many as available for livestock use, 24,625 aum's according to its EIS which was issued on or about April 1, 1980. Federal wildlife refuges accomodate livestock. You propose to establish an adjacent BLM wildlife refuge from which all livestock is to be excluded yet the Fish and Wildlife Service says that the critters are used as a management tool.

4 (6) You state on page xxi, which is a part of your summary at the beginning of the document, that and I quote, "the proposed action proposes the elimination of grazing in High Rock to maintain and enhance various primitive, scenic and wildlife values." When you use the word primitive, you are apparently referring to archeological values. Elsewhere on the same page you claim that there are over 20,000 such sites in the entire unit and that 40 are cultural resources of National Register quality. It should be obvious to all that if you are going to establish an archeological refuge out in that isolated area that it would take the United States Army to protect it from the pot hounds once you have advertised its creation. You state that these sites and any resource values which are to be found upon the ground thereabouts, have survived a hundred years of livestock grazing plus being walked over by Deer and Antelope. It would appear that the damage that has been done this last century, if any, have been very slight of there would be nothing left today that would cause your agency to feel that it should move in, advertise and impliedly invite the pot hunters to move in and take what is left. The so called Applegate Trail which runs through this sub-unit is on the National Register. The years come and go but no one has seen fit to attempt to nominate the 40 other objects to which you make general reference. When one surveys all of our public land legislation down to and including that enacted October 25, 1978, there is no justification for singling out an immense tract of this size and setting it aside for the exclusion of the grazing of livestock. You next speak about the scenic values. There is no criteria by which one can judge the scenic value of any view of our western landscape. The Congress has never attempted to give you any definitions. Some would say that if they look across northwestern Nevada that there is no other place in the country where one can look so far and see so little. On the other hand, another would say that if you cannot see beauty in the region, then there is something wrong with you and not with the area.

4 But when it comes to opinions or no opinions upon such a subject, the effect thereof is not relevant when one is concerned with stock feed. Turning to the wildlife values mentioned above, the wildlife and domestic stock have lived together on this range for the past century. Your projections that if the livestock is removed that wildlife numbers are going to shoot through the roof, are much too optimistic. If we go back 45 years ago before the Sheldon Refuge was established and the Federal Government made no attempt to manage its acres, the northwest Nevada and northeastern California and cattle and sheep numbers were higher than they are today, there were more Deer and Antelope in the area than there are today. The same could be said for the Hart Mountain Federal Antelope Refuge which exists onward north another 40 miles. Interested citizens were prompted to cause the refuges to be established because of the several thousand antelope that use the area. Thereafter the Antelope and Deer were babied and the livestock numbers substantially reduced. Today it is amusing to listen to officials of the Fish and Wildlife Service explain why they can only let the citizens of Nevada harvest 65 Antelope from a 500,000 acre refuge and the citizens of Oregon harvest 20 Antelope from a 275,000 acre refuge. Across the line in northeast Lassen and eastern Modoc Counties, the Antelope population is at an all time high. Yet the animals graze exclusively upon BLM and private pastures without the benefit of any state or federal wildlife refuge whatsoever. Your contention that you have to create another 90,000 acre refuge out of sub-unit 1 in order to stimulate the population of Deer and Antelope has no foundation whatsoever. Everytime I come across such a pitch, I turn to and enjoy the colored photographs of Deer and Antelope grazing upon federal owned crested wheat seedings and sharing the same with domestic livestock. As stated above, I submit that there is no statutory authority for you to attempt to create such a wildlife refuge. It is generally understood that there is but one way on the face of the earth to create wealth, taxable wealth, and that is through the application of labor and capital to a natural resource. That is what I am doing for a living. As I read the list of alleged resources which you show on page 1-10, I have a strong feeling that I should be permitted to continue to graze my stock in sub-unit 1 to serve as an example to our urban population of how rural America supplies it with food and fiber.

(7) Again I return to the 325,000 acres of private land scattered through the Cowhead-Massacre Planning Unit which you propose to take out of economic production because the owners thereof would not be able to run enough livestock with which to generate the

Mr. Rex Cleary
April 29, 1980
Page 5

funds with which to pay the property taxes. These acres would have to go back into public ownership when so forfeited. Private lands produce taxes while public lands consume them. The Federal Government has acquired 4 percent of the State of Nevada within the past few years, close to 10 percent of California and 8 percent of Oregon. Our national government is going to fall of its own weight if private ownership of a sufficient number of acres is not encouraged and guaranteed in order to carry forward our civilization as we have known it.

5 | (8) It is my position that the Congress has dedicated the so called Taylor grazing lands of the west to multiple uses, one of which is for the grazing of livestock and that should be the number one objective of your agency to administer these acres for the benefit of all concerned with a fair share for all.

6 | (9) It is obvious from reading that portion of your proposed EIS covering sub-units 1 and 2, that you wrote it prior to the enactment of Public Law 95-514, which was enacted on October 25, 1978. All of the responsive letters which you have reproduced in the back thereof are dated prior to October 25, 1978. That statute carries a preamble which states and I quote, "to improve the range conditions on the public rangelands", and goes on to state that it may be cited as the "public range lands improvement act of 1978". It is apparent from reading this latest statutory expression of opinion by the Congress that it is doing everything possible to dedicate the public lands under your administration to multiple use programs which will create the highest possible benefits to all of our citizens through the production of food and fiber as well as recreation and wild meat. The document may meet the needs of his Honor in the case of National Resources Devense Council vs. Morton, et al, which was decided in 1973 but it is out of step with the Congressional enactments of 1976 and 1978.

(10) A reading of Section 12 of the act of October 25, 1978, and the steps which you and your superiors have taken to implement that section by the establishment of an experimental stewardship program is further proof that what your proposed Environmental Impact Statement has to say about sub-units 1 and 2 is out of date. On April 23 and 24, 1980, at Alturas, California, you, as the

6 representative of the Secretary of the Interior and the Supervisor of the Modoc National Forest, as the representative of the Secretary of Agriculture, along with representatives of units of the state governments of Nevada and California together with representatives of so called environmental groups comprising voluntary associations of citizens and the grazing permittees in the entire Cowhead-Massacre Planning Unit, plus those in the planning unit abutting the same on the south known as the Tuledad-Home Camp Planning Unit activated said Section 12 by placing in operation the so called Modoc-Washoe experimental stewardship program, to such a degree as to give new direction to the objectives to the owners of the federal resources concerned. It is the hope of all concerned, including yourself, that by the time this committee and all who have volunteered to dedicate their collective efforts to assist, have reached the date of December 31, 1985, set forth in said Section 12 that the Congress will be pleased and will provide sufficient financial tools to finish the program which this representative group of citizens can be expected to launch.

(11) Your agency has notified the permittees that it is quickly moving to activate subsections 2 and 3 of said Section 12, to the end that we permittees can advance our grazing fees in order to expedite "range improvement work". It is obvious that the right hand of your agency and we permittees cannot move in that direction at the same time that your agency's left hand is trying to exterminate us.

7 (12) Bighorn Sheep. Since the Chapters of your proposed EIS relating to sub-units 1 and 2 were written, the California Department of Fish and Game and the U.S. Forest Service have liberated a goodly number of Mountain Sheep in the south Warners across Surprise Valley to the west where there are plenty of snow covered peaks where they can jump from precipice to precipice in the summer months along the bottoms of which there is ample feed to carry them through the winter. All of we citizens in Surprise Valley welcome this undertaking. The Bighorn Sheep are also to be found on the Sheldon Refuge which abutts the Cowhead-Massacre Planning Unit on the north, they having been moved in from the Hart Mountain Refuge a few years ago. The introduction of some 25 years ago of these animals to the Hart Mountain Antelope Refuge has also resulted in such animals

Mr. Rex Cleary
April 29, 1980
Page 7

7 | being placed on the Steens Mountains and elsewhere in the Great Basin to where Mountain Sheep are no longer considered to be an endangered species. They can be annually hunted under permit in several western states. I submit that there is no justification whatsoever for attempting to move into this multiple use area, eject the livestock and try to create another single use pasture for the benefit of Mountain Sheep and the Deer and the Antelope. As for the latter, the State of California will issue 450 permits to shoot Antelope this Fall in Lassen and Modoc Counties where there are no federal Antelope Refuges, a much better opportunity for hunters than is offered by the Sheldon and Hart Mountain Refuges as indicated above.

(13) We should ever remember that the elimination of domestic livestock on the Italian Penninsula due to governmental bureaucratic pressure, quickly starved the three million inhabitants of Rome into submission when the Barbarians attacked. The cities of America need protection today from those citizens who, without thinking, constantly advocate the importation of food and fiber from abroad coupled with the turning of our western rural lands into as many single use parks and refuges as such advocates can imagine.

Yours truly,

B.G. Bunyard

B.G. Bunyard
Box 184
Cedarville, CA 96104

Comment

Response

1. The Federal Land Policy and Management Act (1976) states that the Secretary has the authority to cancel, suspend or modify a grazing permit or lease (Section 407a). The Taylor Grazing Act (1934) states that the Secretary is authorized at his discretion, to examine and classify lands within a grazing district which are more valuable or suitable for any uses other than the livestock use provided for in the Act (Section 7). Should the Secretary determine that cancellation of grazing use in an area is necessary for the orderly use and for the protection of an area, he would be well within guidelines set forth by both acts.
2. The Cowhead/Massacre EIS was written to analyze impacts of a land use plan on the 769,000 acres of public lands in the study area. The Proposed Action is one of ten (10) alternatives which were written to meet land use plan objectives and were not written or designed to decrease the value of private lands in the study area as you have suggested.
3. The Proposed Action and several of the alternatives would increase the overall productivity of the entire study area. Long term impacts of the Proposed Action indicate that the livestock AUM's will approximately double which would result in an increase in Animal Units produced in the study area. In addition to meat produced by livestock, production of red meat will be increased through the harvesting of big game in the study area.
4. The land use plan for Sub-Unit 2 was designed to enhance archaeological, historical, wilderness, recreational values as well as wildlife values in the area. Chapter 3 analyzed many of the adverse impacts on these values associated with grazing. This analysis indicated that grazing would not fit into the management scheme. However, alternatives to the Proposed Action did analyze prescription livestock grazing in the area for the purpose of habitat improvement. Analysis showed that this type of grazing could indeed be beneficial.

The exclusion of livestock grazing is not the result of any single resource in the area, but rather, it is the result of the collective resource values and potential resource values in this very unique area that has made livestock undesirable for the purposes of long term management of the area.

5. The Congress did indeed establish a multiple use policy for public lands by passing the Federal Land Management and Policy Act 1976. However, the Act does not imply that multiple use must occur on every acre of public land. The Cowhead/Massacre land use plan as stated in the Cowhead/Massacre EIS proposed to have multiple use management over the entire study area, with units within the study area being designated to have greater values for certain resources.
6. Public Law 95-514, enacted October 25, 1978, is not in conflict with Cowhead/Massacre EIS. This EIS has analyzed impacts resulting from livestock grazing, has made proposals for improved grazing management and has made specific recommendations for improvement of the range through land treatment and grazing exclusions.

The document meets needs required as a result of NRDC vs Morton (1973) and is very much in step with Congressional enactments of 1976 and 1978. The Rangeland Improvement Act will provide the means for implementation of land use plans in Sub-Units 1, 2, 3, and 4.

7. To reiterate responses made earlier; first, the removal of livestock from an area for the purpose of reasonable management of five other resource values does not conflict with multiple use principles outlined in FLPMA. Second, the introduction of bighorn sheep is only one objective for the wildlife resource in the area, of which wildlife is one of five resources (archaeological, historical, wilderness, and recreation) being managed for in Sub-Unit 1. The statement that the BLM is creating a single use area strictly for wildlife is totally incorrect.



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION NINE

Two Embarcadero Center, Suite 530
San Francisco, California 94111
Dept. of Interior

ARIZONA
CALIFORNIA
NEVADA
HAWAII
GUAM
AMERICAN SAMOA

April 8, 1980

RECEIVED

IN REPLY REFER TO

HED-09

BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

Mr. C. Rex Cleary
District Manager
Bureau of Land Management
P. O. Box 1090
Susanville, California

Dear Mr. Cleary:

We have reviewed the Draft Environmental Impact Statement for the proposed grazing management of the Cowhead/Massacre Planning Units, Susanville District, California and Nevada, and provide the following comment.

1 | The truck traffic associated with the proposed livestock grazing plan should be addressed in the EIS. The State and County highway routes to be used and the expected time schedule for such use should be identified.

We appreciate this opportunity to review the subject Draft EIS and would like to receive a copy of the Final Statement when it becomes available.

Sincerely yours,

Neil Dillabough, Director
Office of Environment and Design

Comment

Response

1. The study area contains approximately seven (7) miles of paved road. Truck traffic is presently at very low levels and implementation of the proposed grazing management would not significantly alter present use.



United States
Department of
Agriculture

Soil
Conservation
Service

2828 Chiles Road
Davis, CA
95616

(916) 758-2200

April 9, 1980

Mr. C. Rex Cleary, District Manager
Bureau of Land Management
P. O. Box 1090
Susanville, CA 96130

Dear Mr. Cleary:

A copy of the draft environmental statement on Proposed Grazing Management for the Cowhead/Massacre Planning Units, Susanville, California, was forwarded to the Soil Conservation Service for review and comment.

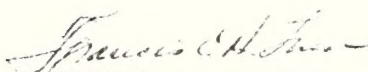
We have reviewed this statement and find no controversial items within the realm of the Soil Conservation Service's responsibilities. We find no conflict with any SCS ongoing or planned programs or projects. No prime or unique agricultural land will be affected. There will be no adverse impact upon existing conservation systems. No significant water resource will be lost to the project.

We do, however, have several other comments regarding the EIS.

- 1 | From a statistical point of view, the number of condition transects (142) and trend transects (45) appear to be somewhat lacking for decision making.
- 2 | The Service would feel more comfortable with this EIS had BLM used the Service's soil surveys for Surprise Valley-Homecamp and the advance report for Washoe County, Nevada, North Part which contained range site descriptions for BLM use. These descriptions were developed using widely accepted standard methodology for inventorying rangeland rather than a relatively new and untried procedure (Anderson's Method). Anderson's Method of Ecological Site evaluation was developed in 1978 for another study area and for an entirely different objective.
- 3 | With regard to the use of antelope bitterbrush as a key species for judging degree of range use by cattle, this may present difficulty because of the heavy use of this species by wildlife.

We appreciate this opportunity to review and comment on this proposed project.

Sincerely,



FRANCIS C. H. LUM
State Conservationist

Dept. of Interior
RECEIVED

1980

**BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA**



Comment

Response

1. From a stochastic viewpoint the number of condition and trend transects are low. The Proposed Action and the alternatives did not use the transects to establish stocking rates. Stocking is a function of utilization, areas to be used and deferment of use.
2. The order III soil survey was used in assigning range sites. The SCS methodology requires approximately double the man minutes per transect than does Anderson's method. At the time of the inventory cost was one of the prime considerations in developing inventory procedures. In many cases, field checks of the range sites indicated that Anderson's sites more closely reflected the actual range site than did the SCS range sites. Anderson's methodology derives from a long career with the SCS and we consider it to be as good or better than SCS procedures.
3. Utilization of bitterbrush by wildlife will be evaluated as part of the monitoring system. Winter use versus grazing season use will be compared. The goal of keying management to bitterbrush is to provide sufficient browse for wildlife and livestock use while improving bitterbrush stands to maximum vigor and production.



United States Department of the Interior

BUREAU OF MINES
2401 E STREET, NW.
WASHINGTON, D.C. 20241

March 20, 1980

Memorandum

To: District Manager, Bureau of Land Management,
Susanville, California

From: Director, Bureau of Mines

Subject: Draft environmental statement, proposed livestock grazing
management for the Cowhead-Massacre Planning Unit, Susanville
District, California and Nevada

Thank you for the opportunity to review this draft environmental statement.

We believe that the statement should include some discussion concerning geology or mining potential as well as specific statements explaining how the proposals would impact future mineral activities. A review of the list of references and appendixes fails to indicate that mineral activities were considered.

A search of our Mineral Industry Location System (MILS) data revealed that the planning unit area has four sand and gravel pits of unknown status, a formerly productive underground gold-silver mine, a titaniferous iron placer of unknown status, an explored mercury prospect, and another prospect of unknown commodity and status. The BLM list of active claims (computer printout 1/30/80) shows a few claims are active in the area; others may have been in the past.

1 | Will the proposed action or any of the alternatives affect accessibility of the lands in the study area for purposes of prospecting, claim locating, mineral leasing, or mine development? If not, we suggest addition of a statement similar to the following: "Mineral prospecting and development activities on planning unit lands will continue to be administered, as they have been in the past, under current mining laws."

Assistant Director
Lindsay D. Norman

Dept. of Interior

RECEIVED

APR 28 1980

BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA



Comment

Response

1. Accessibility for the purposes of prospecting, claim location, mineral leasing and mine development, except for foot or horse travel, could be affected by implementation of the Proposed Action or any of the alternatives, except Alternative 1, in Sub-Unit 1, High Rock Complex. Neither the Proposed Action nor any of the alternatives for the remaining Sub-Units would hinder access, foot or mechanized means, for the above stated purposes of prospecting, etc.

The overall planning goal for Sub-Unit 1 is to maintain the primitive values and scenic resources in the High Rock area. Specifics with respect to the values in the High Rock Complex are enumerated in the Draft EIS for Cowhead/Massacre, page 1-10 and Chapter 2. In summary, "preservation and enhancement of these primitive characteristics and development of climax vegetation conditions require elimination of factors causing modification of flora, fauna, and physical setting." Mining exploration and development would be a factor that would cause modification of flora, fauna, and physical setting, therefore mining exploration and development would be inconsistent with the goals and objectives for Sub-Unit 1, High Rock Complex.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
2800 Cottage Way, Room E-2727
Sacramento, California 95825

Dept. of
REC F

May 6, 1980

BUREAU OF
LAND MANAGEMENT
SUSANVILLE, CA. 96150

Memorandum

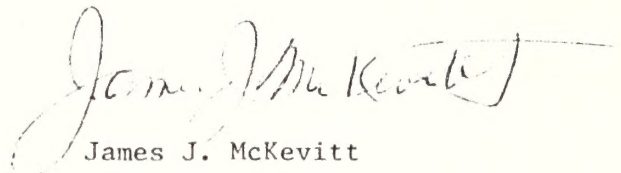
To : District Manager, Bureau of Land Management, Susanville, California

From : Field Supervisor, Fish and Wildlife Service, Sacramento, California
(ES-S)

Subject: Review of draft EIS, Cowhead/Massacre Planning Units (EC 80/6)

Attached is a copy of comments received from the Sheldon-Hart Mountain-Modoc NWR complex for your consideration for inclusion in the final statement. The Sacramento Endangered Species Office review indicated that there are no problems in connection with candidate plant species proposed for threatened or endangered status.

We appreciate the opportunity to comment on the draft statement.


James J. McKeivitt

cc: Refuge Mgr., Sheldon-Hart Mountain-Modoc Refuges, Lakeview, OR
FW, SESO, Sacramento, CA



Memorandum

TO : Bill Sweeney, Area Manager
Sacramento, California

FROM : Refuge Manager, Sheldon-Hart Mountain-
Modoc Refuges, Lakeview, Oregon

SUBJECT: Comments on Cowhead Massacre Draft EIS

DATE: April 8, 1980

Our review of the subject EIS is primarily on those sections that vary from the Sheldon National Wildlife Refuge EIS, the adjoining portion of the areas where wildlife habitat is likely to be extended and where common range users are involved.

1. The proposed action: Chapter I appears to be contradictory. Page 1-1 shows that one objective is to stabilize the social environment, with special consideration for family owned and operated ranch style yet table 1-5 shows 100% reduction of some operators.

2. Season of use. Chapter I - page 1-15 and table 1-5. We suggest the June turnout date for sub-unit 2 management area E, is unrealistic for those sites that occur below 6000 feet elevation, that is, all sites below the bitterbrush zone. Most of these sites are "ready" by May 1. We realize, however, that your fences or allotment boundaries do not coincide with site boundaries. We recommend using approximate dates and specific growth height of key forage species for determining range readiness.

Using bitterbrush as a key species is commendable. However, we question if you will be able to achieve your desired level of utilization of bitterbrush with a season of use of July through September. This is the period of time that livestock use bitterbrush most heavily.

We suggest fences be aligned on or near ecological sites so livestock can be used to treat forage as needed. This seems to be the only practical way to adequately treat forage with livestock. The goal (page 3-9) of even distribution may not be achievable without fencing on range site boundaries. We felt that very little, if any, consideration was given in the Draft EIS to refencing on ecological site boundaries.

3. Fences, Page 1-23. We recommend substituting 38" for 42" maximum height on fences around springs for wildlife since deer may use the areas quite heavily.

4. Deer migrations management area 2E (page 3-45). Recent deer migration studies on Sheldon National Wildlife Refuge have indicated most of the deer from Sheldon winter in or near Virgin Valley and none have been recorded going south to management area 2E. However, the study is not completed and there still may be some migration to the south off the Refuge.

5 | 5. Bitterbrush management (page 3-45) Cites literature indicating bitterbrush stagnation and five years of non-use. Other literature by Tueller and Tower (Journal of Range Management, July 1979) indicate stagnation begins after one year of non-use and that production can be reduced as much as 70% within two years.

6 | 6. Alternative 6 (page 8-61). Coordinated plan with FWS. As written, it suggests the objectives are joint ventures. This is not true. The Fish and Wildlife Service objective is to provide and manage the Refuge as a representative high desert habitat for optimum populations of native plants and animals. We question the BLM objective "to provide rest, rotation..." as stated. This is not our interpretation of their objective.

7 | 7. Wildlife objectives. The report implies that by changing the livestock use wildlife populations will automatically respond to objective levels. Wildlife populations are dynamic and it must be recognized that other factors such as climatic conditions, predation, population cycles, hunting, etc. will affect the population. They may or may not respond to habitat manipulation.

We appreciate the opportunity to comment on this Draft EIS and to have worked with personnel from the Cedarville office in its development.

MRKaschke:ba

Bruce Mission

Comment

Response

1. All three major land use objectives identified apply to the study area as a whole not necessarily to each acre of land or each operator. Stabilizing the social environment with special consideration for family owned and operated ranch style may not be possible for every individual. However, it may be possible for Surprise Valley operators as a group.
2. Several alternatives examined other turnout dates. Turnout dates based on phenology of key species has been added to Chapter 4. One important reason for choosing bitterbrush as a key species is that the area will be grazed during the time period livestock are using bitterbrush most heavily.

Habitat sites in Cowhead/Massacre are not always very well defined and separated. There is little opportunity for a large scale refencing along ecological site boundaries.

3. It is Bureau policy to construct 42" fences for any livestock exclusions. Bureau studies in Idaho have shown that 42" fences present little hazard to deer. In fact, healthy deer have little difficulty negotiating 48" fences on relatively flat ground. (BLM Tech. Note 336 Sept. 1979.)
4. This point was stated on p. 3-45, Column 1, Paragraph 3, lines 1-6.
5. Apparently, the amount of nonuse before bitterbrush begins to stagnate depends a great deal on its condition class prior to removal of livestock. The statement concerning bitterbrush stagnation has been changed to reflect this.
6. "Objective" was a poor choice of words. The statement has been rephrased in the Final ES.
7. The objective is to "provide forage" for objective numbers of wildlife. It is true that several other variables affect population levels, especially in the shortterm. It is our contention that over the long term, anticipated responses in habitat conditions will at least allow for projected population increases.



United States Department of the Interior

HERITAGE CONSERVATION AND RECREATION SERVICE
PACIFIC SOUTHWEST REGION

SAN FRANCISCO, CALIFORNIA 94102
450 Golden Gate Avenue Box 36062

IN REPLY REFER TO:

PSW 200
DES 80/6

APR 10 1980

MEMORANDUM

To: District Manager; Susanville Office, Bureau of Land Management

From: Chief, Federal Coordination & Landmarks Division

Subject: Review of Draft Environmental Statement Prepared on Proposed
Grazing Management for Cowhead/Massacre Planning Unit (DES 80/6)

We have reviewed the subject document and find that impacts, of the proposed actions on cultural and recreational resources, have been quite adequately addressed. In fact, the cultural resources discussion is one of the best we have seen. The document preparers should be commended for an excellent job.

1 | A minor graphic improvement is suggested for the final statement. The map page numbers are very similar to the text page numbers which can be confusing. Addition of the prefix "M-" or "MAP-" is suggested to differentiate between map and text pages.

Finally, we look forward to the initiation of the proposed cultural resources survey and monitoring practices which should provide valuable information to the scientific community and protect significant resources

Dept. of Interior
RECEIVED
1980
BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

Comment

Response

1. We have made your recommended improvement in the Final ES.



RECEIVED

APR 11 1980

ROBERT LIST
GOVERNORJOSEPH C. GREENLEY
DIRECTORBUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

1100 VALLEY ROAD

P.O. BOX 10678

RENO, NEVADA 89520

TELEPHONE (702) 784-6214

April 4, 1980

Mr. Mike Nolan
Office of the State Planning Coordinator
Heroes Memorial Building
108 West Second Street
2nd Floor
Carson City, NV 89710

Dear Mike:

The Nevada Department of Wildlife appreciates the opportunity to review and provide comments to the Cowhead-Massacre Planning Unit Draft EIS.

SAI NV# 80300049

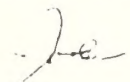
Our comments are:

1. The Department supports the Bureau of Land Management's proposed action for this planning area with the following stipulations regarding the proposed seeding.

Flow and Seeding Area Criteria

- 1
- a. Potential seedings should be limited to those areas which are not expected to respond to the grazing system within a reasonable length of time.
 - b. Ecological factors such as conducive soils and proper precipitation zones (8-12 inches) must be adequate in order to insure seed germination and seedling establishment.
 - c. Potential seeding areas must not be placed in documented critical wildlife habitats.
 - d. The cost/benefit ratio of any proposed seeding must be effective and justifiable.

Sincerely,


Joseph C. Greenley
Director



Comment

Response

1. Land treatment criteria have been specified in Chapter 4 of the Final ES.

Resources Building
1416 Ninth Street
95814

(916) 445-5656

EDMUND G. BROWN JR.
GOVERNOR OF
CALIFORNIA

Dept. of Interior

RECEIVED



APR 10 1960
BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

Air Resources Board
California Coastal Commission
California Conservation Corps
Colorado River Board
Energy Resources Conservation
and Development Commission
Regional Water Quality
Control Boards
San Francisco Bay Conservation
and Development Commission
Solid Waste Management Board
State Coastal Conservancy
State Lands Commission
State Reclamation Board
State Water Resources Control
Board

Department of Conservation
Department of Fish and Game
Department of Forestry
Department of Boating and Waterways
Department of Parks and Recreation
Department of Water Resources

Mr. C. Rex Cleary
District Manager
Bureau of Land Management
Post Office Box 1090
Susanville, CA 96130

1960 APR 14

Dear Mr. Cleary:

The State of California has reviewed the draft environmental impact statement on the proposed management program for public lands within the Cowhead/Massacre Planning Unit, submitted through the Office of Planning and Research in the Governor's Office.

This review, in accordance with the requirements of Part II of Office of Management and Budget Circular A-95 and the National Environmental Policy Act of 1969, was coordinated with the Departments of Boating and Waterways, Conservation, Fish and Game, Forestry, Parks and Recreation, Water Resources, Food and Agriculture, and Health; the Air Resources and State Water Resources Control Boards; and the State Lands Commission. We have the following comments on the proposed plan:

DEPARTMENT OF FISH AND GAME

- 1 DFG comments that the report lacks essential wildlife habitat information. For example, it does not contain information that DFG provided to BLM concerning sage grouse strutting grounds. This should be added to map 2-4. The report should also contain information on antelope kidding habitat, which is critical for these animals and should be protected for this value.
- 2 Although several thousand acres are subject to habitat manipulation, primarily conversion to grassland, the report does not contain information on selected sites. Such habitat changes could adversely affect the wildlife which depend on these sites and DFG could comment in detail if BLM identified such sites.
- 3 The selected alternative generally shows positive impacts for wildlife, mostly within Nevada. The report fails to recognize the autonomy of the states regarding wildlife values and benefits. The summary on page XXI under proposed action identifies the Long Valley and Mosquito sub-units for "livestock as a dominant use." Since

3 | these sub-units include all of the planning unit area in California, this implies that livestock use will take precedence over other uses when management programs are implemented. The lands in question are important for wildlife and DFG takes exception to this approach. The department, therefore, recommends that the Long Valley and Mosquito sub-units in California be reevaluated and that BLM give proper consideration to wildlife uses.

4 | Several small, isolated parcels of public domain in the Warner Mountains were considered when working teams were making preliminary recommendations for this management plan. These areas are not included in this draft, however. DFG recommends, therefore, that the final report include a statement to explain why these areas were deleted.

Comments or questions regarding the above response should be directed to A.E. Naylor, Regional Manager, DFG, Post Office Box 1480, Redding, CA 96099 or (916) 246-6511.

DEPARTMENT OF FORESTRY

5 | The proposed management plan reduces livestock below present carrying capacity in all units, but the report does not adequately explain why this was done. The final report should discuss this.

6 | In the calculation of animal unit months, cattle and deer appear to be figured on the same basis. Actually, cattle and deer often complement each other on rangeland, but there is no discussion of this in the report.

7 | The report leaves the reader with an impression that livestock grazing is the only factor operating upon the ranges. Many of the adverse changes in the Great Basin rangelands have been associated with factors such as fire exclusion, but this is not discussed as a factor in the development and maintenance of the vegetation types in the planning units.

8 | Although livestock numbers were reduced in 1963, there seems to be no significant change in range conditions. This indicates that other factors may have been in operation. In addition to fire exclusion, climatic difference could also be important. The department, however, found no charts or graphs of rainfall or temperatures during the years following 1963. Much of the information on present conditions was collected during 1977, the second year of one of the most severe droughts ever recorded in the western United States. The report, however, contains no discussion of the effect that this might have had upon the evaluation of range conditions and trends. The department has previously commented that the use of "average conditions" for Great Basin and annual or ephemeral ranges must be tempered with the knowledge of historic prolonged droughts and the fact that two of every three years is "below normal" in rainfall.

9 The evaluation of range condition and trend appears to be based on vegetation density and composition. There is no mention of soil factors or erosion processes (e.g., active cutting of gullies or healing of gullies) as indicators of condition and trend. Vegetation alone is not a reliable indicator, the department believes, especially in a very wet or dry year. Consequently, BLM should also use indicators such as those in "The Western Range" (U.S. Senate Document 199), or BLM's more recent 208 Report.

10 The use in this plan of Anderson's unpublished 1978 report makes it difficult to compare the management proposals with general range management principles.

11 The wildlife management part of the report appears to reflect inadequate field work. For example, the list of species found in the big sage (sagebrush) type in Table D-6 is confusing in that mourning dove, turkey vulture, red-tailed hawk, and California quail undoubtedly occur in both grazed and ungrazed areas. The determination of wildlife values is unusual: waterfowl areas are downrated because they have no winter deer range, while upland summer deer ranges have lower values because they have no waterfowl habitat. These calculations weaken the wildlife conclusions.

12 The various alternatives proposed all appear to have some good management practices incorporated into them. None consists of a balanced, complete program of good management, however. For example, Alternative 5 calls for some vegetation manipulation including reintroduction of fire into the environment, but it also calls for increasing the number of wild horses in all units. With the overgrazing and other damage that excessive numbers of wild horses cause, it seems questionable to increase these animals beyond stated objectives. The department recommends that the final report include a "best management" alternative so as to most nearly meet the objectives of the management plan.

13 The alternatives do not appear to reflect the programs of other Federal agencies. The relation of Forest Service grazing allotments in the area is not explained, nor is the possibility of using such USDA programs as feed grain surplus, loans, etc., for rancher relief in the adjustment period mentioned. Although the department understands that the Cowhead/Massacre Unit was not an interagency "Coordinated Land Use Planning" area, this is not mentioned explicitly in the management plan.

WATER QUALITY CONTROL BOARD

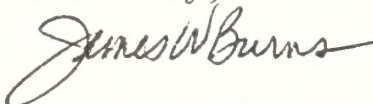
Because of the bi-state nature of the planning area, and the non-specific nature of the discussion of water quality impacts, it is difficult to evaluate the plan's effects. The Board understands that more specific assessments will be prepared for individual projects carried out under this plan, and looks forward to commenting in more detail on these individual projects.

14 The proposed action, and Alternatives 3 and 8, appear to offer the best protection for water quality if livestock grazing is to be retained. The text should clarify the slight differences in effects of these alternatives. For example, it is unclear whether, in Summary Table 4, the difference from "moderate to high improvement" of fisheries under the proposed action, and "great improvement" under Alternative 8 is due to the latter's lower number of Animal Unit Months.

The Board commends BLM for its plans to fence a number of riparian and sensitive habitats, and recommends that additional riparian areas be fenced where feasible. The Board also concurs in the proposal for water quality monitoring, which should be useful in documenting the progress of stream restoration efforts.

Thank you for providing an opportunity to review this plan.

Sincerely,



JAMES W. BURNS

Assistant Secretary for Resources

cc: Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814
(SCH 80030704)

Comment

Response

1. This has been corrected in the Final ES.
2. Specific guidelines governing areas that may be culturally treated are presented in Chapter 4. Adherence to this guidelines will alleviate significant adverse impacts to wildlife.
3. Although livestock has been identified as having priority in Sub-Units 3 and 4, several aspects of the proposal are designed to benefit wildlife values. Implementation guidelines and mitigation sections have been rewritten to clarify this.
4. Management proposals for the small isolated parcels of public land in the Warner Mountains have been deferred for consideration with the joint BLM Forest Service EIS covering the Warner Mountains. It was felt that since these parcels are more similar to the remainder of the Warner Mountains, it would be more appropriately and more adequately handled in this manner.
5. The discussion on determination of stocking rates has been revised and hopefully clarified.
6. The relationship between livestock AUM's and deer AUM's is discussed in a footnote on all Forage Consumption Summary Tables.
7. The draft EIS discusses the role of fire and drought on vegetative condition in Chapter 2 (2-7 to 2-10). However, the EIS is a grazing statement and it should be apparent that most of the discussion will center around livestock grazing.
8. This point was mentioned on page 2-10 of the DES. The most important point here is that condition and trend were not used in determination of stocking rates.
9. The draft EIS indicates that 83% of the planning area is in the slight erosion class and approximately 1-2% of 1% of the unit is in the severe class. Thus it would appear that soil erosion would not provide a good indicator of condition and trend. Basal area of grasses and shrub canopy cover should not vary radically year to year, and do serve as good indicators of condition and trend.
10. See Response to SCS Comment #2.
11. Table D-6 and all the others in Appendix D are not intended to be a complete list of species using particular habitat types. Such a list is included in the Cowhead/Massacre URA on file in Susanville and Cedarville BLM offices. The tables are the results of a fairly limited study comparing species observed in grazed versus ungrazed sites. Species known or expected to occur in various sites were not included in the list when they were not observed therefore giving no indication of the effect of habitat condition on those species.

Comment

Response

There are shortcomings in the determination of wildlife values in Chapter 2. These are pointed out in Appendix E which also fully explains the technique.

12. See Chapter 4.
13. The draft EIS contains many references to BLM/Forest Service and BLM/Fish and Wildlife Service use by operators in the planning unit. Both the Forest Service and the Fish and Wildlife Service are currently working on their land use plans for areas adjacent to the planning unit.
14. This is clarified in the narrative analysis of Alternatives 3 and 8 in Chapter 8.



*copy
comment
file*

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX

215 Fremont Street
San Francisco, Ca. 94105

Dept. of Interior
RECEIVED

Project #D-BLM-K65034-CA/NV

C. Rex Cleary, District Manager
Bureau of Land Management
P.O. Box 1090
Susanville, CA 96130

DEPT. OF INTERIOR
RECEIVED
BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

APR 22 1980

BUREAU OF LAND
MANAGEMENT
CEDARVILLE, CALIFORNIA

Dear Mr. Cleary:

The Environmental Protection Agency (EPA) has received and reviewed the Draft Environmental Impact Statement (DEIS) titled PROPOSED LIVESTOCK GRAZING MANAGEMENT FOR THE COWHEAD-MASSACRE PLANNING UNIT.

The EPA's comments on the DEIS have been classified as Category LO-2. Definitions of the categories are provided by the enclosure. The classification and the date of the EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal Actions under Section 309 of the Clean Air Act. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and the adequacy of the environmental statement.

The EPA appreciates the opportunity to comment on this DEIS and requests three copies of the Final Environmental Impact Statement when available.

If you have any questions regarding our comments, please contact Susan Sakaki, EIS Coordinator, at (415)556-6925.

Sincerely yours,

Paul De Falco, Jr.

Paul De Falco, Jr.
Regional Administrator

Enclosure

Herbicide Comments

1. The DEIS states that vegetative manipulation will be accomplished through burning and spraying of the herbicide 2,4-D. Adverse effects of 2,4-D on fish and wildlife, including endangered species, are not discussed. This area should be addressed in the Final Environmental Impact Statement (FEIS).
2. The DEIS does not discuss the impacts of 2,4-D on sensitive ecosystems in the area to be treated nor does it discuss the impacts of drift of this chemical on air, soil, and water in adjacent and surrounding areas. These subjects should be addressed in the FEIS.
3. The DEIS presents an inadequate analysis of alternatives for vegetative manipulation. Alternative herbicides should be considered, as should mechanical treatment. The FEIS should address these issues.

Water Quality Comments

4. EPA approved the Bureau of Land Management California 208 Plan on December 19, 1979 which included Best Management Practices (BMPs) developed for livestock grazing to protect water quality. The FEIS should address these BMPs.

EIS CATEGORY CODES

Environmental Impact of the Action

LO--Lack of Objections

EPA has no objection to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

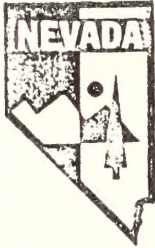
If a draft impact statement is assigned a Category 2, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

Comment

Response

1. A more thorough discussion of adverse impacts of 2,4-D on terrestrial and aquatic wildlife has been added under Alternative 4 in Chapter 8.
2. A set of guidelines has been added to Chapter 4. These guidelines are intended to avoid sensitive ecosystems. A discussion of impacts on the physical environment has also been included in the FEIS.
3. The Final ES addresses chaining, brush beating, and plowing as alternative methods of brush removal.
4. While not specifically identified as such, essentially all "Best Management Practices" identified in the 208 Water Quality Report are either incorporated into one or more alternative proposals or are a matter of Bureau policy.

RECEIVED 1801 DB(9)



MEMO

TO Roland Westergard
FROM Jay Heierierck
SUBJECT COWHEAD-MASSAGRE PLANNING UNIT
DRAFT EIS - SAI NV 80300049

BUREAU OF LAND
MANAGEMENT

DATE 3/24/80

DIVISION OF STATE PARKS

The Nevada Division of State Parks has reviewed this draft EIS for impacts on recreation open space and conservation. The proposed action is very supportive of recreational and conservation interest while, at the same time, the best overall management proposal for other interest. It is endorsed with the following comments.

1. Sub-Unit 1, High Rock Complex, management proposal is supported to protect highly unusual and valuable concentration of resources as cited on pages 1-10 and 2-37. These scenic and primitive values have been recognized by the National Park Service in studying this area for a potential National Park; by the Department of Interior, Heritage Conservation and Recreation Service by being nominated by the Great Basin Review Board for National Natural Landmark Status (as the best display of the volcanic "story"); and consideration by the Division of State Parks as a unit of the State Park System.
2. There are two petrified forest areas that should receive protection. The first is in Sub-Unit III, Management Area A (T43N, R18E) and is Forty-nine Camp Redwood Fossil Site. This area could easily be fenced or protected similar to the many archaeological sites. The second site is in Sub-Unit II, Management Area D, (T44N, R22E) and is Wall Canyon Petrified Forest. This should receive the same protection as above.
3. The Desert National Scenic Trail is cited on page 1-52. Although, this trail is still pending Congressional authorization for national designation, it is an integral part of the Nevada Statewide Trail System. The Division would like to see final determination of the route through this study area. The planned route enters through High Rock Canyon, past Register Rocks, through the narrow Upper High Rock Canyon, to Emigrant Spring, then northeast to the south of Massacre Lake and then into Sheldon National Wildlife Refuge. Where the trail crosses fences a walk-over, gate or other appropriate device should be installed. The trail can be expected to be used by foot and horse users.

- 2 | 4. The Nevada Statewide Trails Plan also indicates three

COWHEAD-MASSACRE PLANNING UNIT DRAFT EIS -
SAI 80300049

2 |

(or more) excursion trails within the High Rock Canyon area. We would like to work with BLM in indicating and implementing these trails at the appropriate time.

5. We concur that the highest type of recreational activity is of a dispersed and unregulated nature; activities such as hunting, rockhounding, hiking, etc. The proposed action would result in the approximate positive means as indicated on the various tables in Chapter 3.
6. The implementation of the grazing management plan requires special consideration and priority to the protection and management of areas with wilderness protection. The proposed action does provide this consideration in Sub-Unit I, but it is our understanding that the recently completed wilderness study identified other WSA's in other sub-Units.
7. Wildlife and cultural resources (archaeological and historic) related recreation are better evaluated by other agencies, e.e., the Department of Wildlife and the Division of Historic Preservation and Archaeology. The Division of State Parks feels that the proposed action or alternatives 2 or 8 would best serve these recreational interest.

3 |

/bg

Comment

Response

1. This is an activity plan level project that would have no impact on grazing management. When site specific plans are developed, fencing these sites will be considered.
2. BLM would welcome any assistance from State Parks in implementing trails.
3. Recently completed wilderness inventories have been incorporated into the Final ES.

April 14, 1980

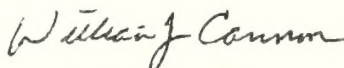
C. Rex Cleary
District Manager
Bureau of Land Management
P.O. Box 1090
Susanville, California 96130

Dear Mr. Cleary:

I have reviewed the Cowhead-Massacre Planning Unit draft environmental statement prepared by the Susanville District. I wish to state that I strongly support the proposed action to remove livestock grazing and to protect the significant cultural resources located within the High Rock Complex.

These non-renewable resources have seldom been given adequate care by Federal agencies in the past. Your proposed action shows a clear understanding of the significance of such resources, their special protection needs, and a willingness to make difficult resource management decisions.

Sincerely,



William J. Cannon
Archeologist



DEPT. OF INTERIOR
RECEIVED

BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

Bureau of Land Management,

P.O. BOX, 1090.

Susenville Calif. 96103.

Att Mr Cleary:

NEVADA PROSPECTORS ASSOCIATION, INC.

P.O. BOX, 94

FALLON, NEVADA, 89406.

OFFICE OF THE PRESIDENT, Phone 702 423 6231
March, 9, 1980.

Dept. of Interior

RECEIVED

MAR 12 1980

BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

Almost ironical caption: Save energy and save America:
It is quite apparent that you have little idea of the waste of energy by
Washington Gestopo Agencies and positively will not become informed, neither
will you consider you are in the Public hog trough and are immune from
your own demands, Practice what you (PREACH)

Page, 1-1. you yap about water and no information yet you pretend to have
all possible answers, write a correct full.

Taking no account of dry years and abundant years and pretend to know about
the fact that native vegetation got there on its own and is there because it
can accommodate to the varieties of weather. and will respond accordingly.

Page 2-35 Cattle. it appears that Cattle are a criminal and should be
hanged, little regard to the competing must have of food stuffs. It seems
this jasper is not in need of sustenance of that sort.

Page 3-35 here again much ado about preserving these useless species but
directly indicates his belief that these species must be sustained and thinks
they decrease with Cattle grazing and seems inclined to blame this loss to
the presence of Cattle and Human beings. Well, Well; What the Hell was he
doing there?

Complains of Archeological loss but defines not at all and fails to
indicate the articles removed or their real loss to modern society. ARE they
really lost/ This rides along with the enormous expenditure of Tax payer \$\$
in Nevada on the fading Pup Fish and the Snail darter fish and for what
purpose, Persons collecting Indian Arrow heads and other such have been
severely criticized for so doing but are reminded that these things should be
let for certain very privileged sorry clobbers to find, (NEVER) S-Club. and
other of same ilk.

Blaming recreationalist for considerable despoiling it is to remind that
in this day, Age it has developed that release from this hectic day on
wheels is a today's necessity or trouble. Uncontrolled.

Loaded with tables the source of which is questionable and possible of
some interest to Rancher benefit doubtful.

Page 2-55 George N. Jewell from Wis. sure it should remain but no one Million

dollars in expenses. Then on page 3-56 you have sarcastic thoughts as to the artistic value of the view, every one to his own opinion but I question His intent to shove his idiot ology on to Me.

Page 3-35 Anderson; Batts Rats, Mice, just how long is it when We were told by Gestopo Washington how dreadful all this was a very serious danger to the health of We the People? Not ~~so~~ so long ago OH! the immense harm of Rabied Rats biting infante at some ~~far~~ far-away place. Now We are infomed or better ~~ordered~~ ordered to protect these same destructors, Batts are all supposed to be Rabie carriers and the Rat is described by Western timber ^{men} as the scourge of the Foorest, certainly they appear to have no enemies,

Page 7-1 Irretreaveable resorses, Irreversable resorses is treated lighrly and not very definete as to just what is refered, one can only guess as to His action in this case. It a historace fact that Civ ilisation does make changes but except in the instance of Mineral resorses that when exasted are not returnable but He seems to be not interested in this resorse. Then what is irretreaveable looses. Like-wise His reference to irreversable looses are of vague displaplay I would wonder why. seemingly this could be described in detail/

ETables, tables,

Page, 8-44here He devoted much chatter about chasing Cattle to accomidate recreational activities and again to eliminate ~~X~~artle wil artificaly impro ve Wilderness potential, (what in Hell is potential) yet B.L.88p577(Wilderness) directly permitts Cattle also Mining, Here I would inject a remark that is so obviously ignored by Washington Gestopoe's, There are just (2)prime Industries on this Planet they provide for all of us all the must have, and needs, lluxeries We ~~possess~~ possess. All this new wealth comes from the soil. and is produced industries Avriculture, ~~Mining~~ including lumbering, Fisseries, Mining. Yet We who provide us with every thing are the blackgerds of tbdays WashintonGestopo, can you justify?

MAPS, MAPS.

Here again this individual Anderson is glorified but for little real information except to glorify the Batt Pack Rat and Mice and what about the immense destruction of property mostly food stuffs, His charge that these Sibjects will vamoose when Humans is positively disputed as my own experience proves quite the contrary, The thrive where Humins habitate. Don't tell me Anderson,

Page D. 3 again Rats other rodents and again glor fied BOY OH BOY!

This edict is so long complplicated and contridicts by reversing its self or more properly Him-self that they and certainly the producers of must have resorses will find it totaly impossable to live with, if this was the end that would be

usenville Calif.

the lost wonder of this Planet. I would think to expect such it to play the part of a I DIOT.

It seems that We have a new meaning to that word(litter) As new dimension as it were, Old Pinecones Pine needles Juniper berries and old Native bunch grasses are now litter also so our most learned informer and enforcer is most generous in letting We the less informed of His superior intelect. and advance knowlege. I am sure We will in time come to slightly appreciate his most generous thought.

NOW, We have another measurement, the intricate details of reading this scale are not for us the stupid to understand and no attempt deemed required .

The entire cocempf is to degrade the two prime industries who while occupying so very little of this Planet's surface have provided all Peoples with so very much and in super abundance It is a most profound dark and closely guarded secret that We are now the worst 'BLACKGUARDS) of today society In providing all needs and luxerues We get the heal of Washington Gestopo enforced by Washington Gestopo minnows.

One man Law writer same Man adjudgicated and enforcer, Executor.

A most immediate opinion by the Appellate Court district 10 that much of the about to be enforced by Gestopo's well known processes has hit a snag.

Here⁹¹⁴ now We are in amost favårable position to protect our Constutational rights, The Congress in Section 10 P.L. 88-579 admitts the local County Governments have sole zoning author ty. This opens the door We have advicated these many years that Legislatures local County Goverments can Legislate on and Law enacted by Congress We cannot change but can ad to The Congress in recognising the Constutational zoning authority has also concented to additions to any Law passed by Congress

These additions are of the kind We the People are well acquainted with. They take the form of County Ordinances why undue delay in issuing grazing permits, there by interfering with proper procedure of Rancher in preparing for the coming grazing season. ~~Unde~~ Undue demands in any way restricting proper management of Cattle on Public Lands Restrictive demands in restricting use of available Water. Thereby becoming a neuisence Disturbing of the peace.. All these are only County Ordinances enacted well within the provisions of P.L. 88-577, and p.l. 94579. and other because in no way does any Law propose to vacate any of these possibilities. . The ^{leg} promoted supposition that Government Officials, Employees are immune from State local Law Ordinances is dispelled.

Copies to:

Thank you,

H.R. Conrad
H.R. Conrad.

State of California

The Resources Agency

Memorandum

To : Mr. James W. Burns
Projects Coordinator
The Resources Agency
Resources Building, 13th Floor
Sacramento, CA 95814

RECEIVED

MAR 25 1980

BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

Date : March 24, 1980

Subject: REVIEW OF DEIS, PROPOSED
LIVESTOCK GRAZING MANAGE-
MENT, COWHEAD-MASSACRE
PLANNING UNIT, SCH#80030704

From : California Regional Water Quality Control Board
Lahontan Region
~~XXXXXXXXXXXXXXXXXXXX~~ 2092 Lake Tahoe Blvd.
P.O. Box 3329
South Lake Tahoe, California 95705
(916) 544-3481

We have reviewed this report, and wish to offer the following comments.

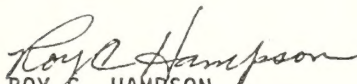
Because of the bistate nature of the planning area, and the non-specific nature of the discussion of water quality impacts, it is difficult to evaluate effects of the plan on our region. We understand that more specific assessments will be prepared for individual projects carried out under this plan.

The proposed action, and alternatives 3 and 8, appear to offer the best protection for water quality if livestock grazing is to be retained. The slight differences in effects of these alternatives should be clarified in the text. For example, in Summary Table 4, is the difference from "moderate to high improvement" of fisheries under the proposed action, and "great improvement" under Alternative 8 due to the latter's lower number of Animal Unit Months?

We commend the Bureau of Land Management for its plans to fence a number of riparian and sensitive habitats, and we recommend that additional riparian areas be fenced wherever feasible. We also concur with the proposal for water quality monitoring. Such monitoring should be very useful in documenting the progress of stream restoration efforts.

Please contact Judith E. Unsicker at this office if you wish to discuss these comments.

Very truly yours,


ROY C. HAMPSON
EXECUTIVE OFFICER

cc: U. S. Department of the Interior
Bureau of Land Management, Susanville



DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
650 CAPITOL MALL
SACRAMENTO, CALIFORNIA 95814

REPLY TO
ATTENTION OF

SPKED-W

Dept. of Interior
RECEIVED

14 April 1980

APR 21 1980

**BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA**

Mr. C. Rex Cleary
District Manager
Bureau of Land Management
P.O. Box 1090
Susanville, CA 96130

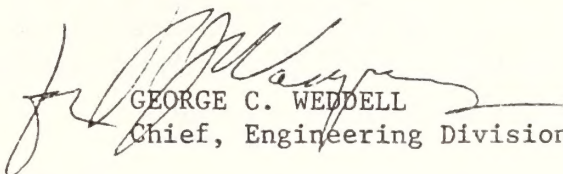
Dear Mr. Cleary:

This is in response to your letter addressed to the Office of the Chief of Engineers requesting review of the Draft Environmental Impact Statement (DEIS) on the proposed livestock grazing management for the Cowhead-Massacre Planning Unit in Modoc County, California and Washoe and Humboldt Counties, Nevada.

Based on our review, the proposed action will not conflict with flood control or other programs within our jurisdiction.

Thank you for the opportunity to review the DEIS.

Sincerely,


GEORGE C. WEDDELL
Chief, Engineering Division

DEPARTMENT OF FORESTRY

Highway 36
Susanville, CA 96130
(916) 257-4171



March 28, 1980

0900 ENVIRONMENTAL PROTECTION
Environmental Impact Statement
Proposed Livestock Grazing
Management for the Cowhead Massacre
Planning Unit
Lassen-Modoc Ranger Unit

Bureau Of Land Management
District Office
P.O. Box 1090
Susanville, CA 96130

Dear Ladies and Gentlemen:

In response to the above named draft Environmental Impact Statement, Clearing-house Number 80030704, we submit the following comments.

Any increases in range improvement burns on private land would require increases in workload of our local District Ranger and range specialist. Travel time and present budget restrictions might make such workload increases significant.

At the March 27, 1980 Resource Conservation and Development meeting, the board voted to continue to study the draft EIS, particularly the economic impact.

Please contact me for further information.

Lloyd Keefer, Ranger-in-Charge

by:

Frank H. Goddard, Unit Forester

cc: Paul Cox, Sacramento
Region Office, Redding





DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/TP11)
WASHINGTON, D.C. 20590 20953
PHONE: (202) 426-2262

Dept. of Interior
RECEIVED

19 MAR 1980

MAR 21 1980

**BUREAU OF LAND
MANAGEMENT**

Mr. Cleary
District Manager
Bureau of Land Management
U. S. Department of the Interior
P. O. Box 1090
Susanville, CA 96130

Dear Mr. Cleary:

This is in response to your Proposed Grazing Management for the Cowhead/
Massacre Planning Units, Susanville, CA.

The concerned operating administrations and staff of the Department of
Transportation have reviewed the material submitted. We have no comments
to make nor do we have any objection to this project.

The opportunity to review this draft statement is appreciated.

Sincerely,

K. G. WIMAN
Captain, U.S. Coast Guard
Deputy Chief, Office of Marine
Environment and Systems
By direction of the Commandant



It's a law we
can live with.



IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR

Natural Resources

BUREAU OF INDIAN AFFAIRS
Sacramento Area Office
2800 Cottage Way
Sacramento, California 95825

MAR 28 1980

C. Rex Cleary, District Manager
Bureau of Land Management
Susanville, California 96130

Dear Mr. Cleary:

We have reviewed the Draft Environmental Statement on the Proposed Grazing Management for the Cowhead Massacre Planning Units, Susanville, California (DES 80/6), and found no adverse impacts to Indian lands under the jurisdiction of this office.

Sincerely yours,

Eddie V. Edwards
For William E. Finale
Area Director

Dept. of Interior
RECEIVED
MAR 30 1980
BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

Glossary

GLOSSARY

- ACTIVE USE:** Grazing privileges which have been paid for and are presently being used. Active use combined with nonuse equals total authorized livestock use. Active use normally is descriptive of federal grazing privileges.
- ADJUSTMENT IN (LIVESTOCK) NUMBERS:** An increase or decrease in livestock numbers to conform to the amount of forage produced in the area in relation to other uses of the area.
- ADJUSTMENT IN (LIVESTOCK) SEASON OF USE:** Adjusting the time of livestock grazing on a range area based on type of vegetation or stage of vegetative growth.
- AESTHETICS:** Dealing with the nature of the beautiful and with judgments concerning beauty.
- ALLOTMENT:** An area of land where one or more livestock operator graze their livestock. It generally consists of public lands but may include parcels of private or State owned lands. The number of livestock and season of use are stipulated. An allotment may be divided into several pastures.
- ALLOTMENT MANAGEMENT PLAN (AMP):** A specific plan for an allotment which uses a system of livestock use to achieve set vegetative, watershed, soil, wildlife habitat and/or recreational objectives.
- ANIMAL UNIT:** Considered to be one mature (1,000 lb.) cow or 5 sheep based upon average daily forage consumption of 26 lbs. dry matter per day.
- ANIMAL UNIT MONTH (AUM):** (1) The amount of feed or forage required by an animal unit for one month. (2) Tenure of one animal-unit for a period of one month.
- ASSOCIATION (VEGETATIVE):** The basic unit of vegetation classification which embodies those characteristics of all actual climax stands among which differences in species composition are not attributable to inherent differences in environments. Applies only to climax plant communities.
- AUTHORIZED LIVESTOCK USE:** The maximum amount of livestock use which could be licensed or permitted.
- BACK COUNTRY:** An essentially roadless area in which the effects of man may be present but are not inconspicuous or unobtrusive.
- BACKGROUND:** The area of a visual zone which lies beyond the foreground-middleground, usually from a minimum of 3-5 miles to a maximum of about 15 miles. Atmospheric conditions in some areas may limit the maximum to about 8 miles or extend it beyond 15 miles.

BIFACE: In archaeology, any chipped stone artifact with flakes removed from both surfaces. The production of some varieties of biface was often a stage in the manufacture of small artifacts.

CLIMATIC CLIMAX: Soil or microclimatic conditions which pose no severe limitation to vegetation; characteristic of undulating topography and moderately drained loamy soils.

CLIMAX COMMUNITY: A biotic community which gain essentially permanent occupancy of a habitat and perpetuates itself there indefinitely unless disturbed by outside forces (from Daubenmire, Plant Communities, 1968, p. 25).

CONTRAST: The effect of a striking difference in the form, line, color, or texture of an area being viewed.

CONTRAST RATING: A method of determining the extent of visual impact of an existing or proposed activity which will modify any landscape feature.

COORDINATED RESOURCE PLANS: Site specific land use plans outlining resource management guidelines for that area including grazing management practices. The plans will be developed by affected livestock operators, concerned interest groups, State Fish and Game, and BLM.

CORE: Archaeologically, a block or stone (e.g., obsidian) from which flakes are removed for subsequent use or further working. Although a by-product of flake production, the exhausted core was itself sometimes utilized, as a scraper, "chopper", etc.

CULTURE AREAS: Geographical regions where a similarity of cultural forms of the occupants of a region are found through ethnographic and archaeological studies.

DEBITAGE: In archaeology, the detritus of stoneworking activity.

DISPERSED RECREATION USE: Recreation use that occurs outside developed recreation sites.

EDAPHIC CLIMAX: Climax vegetation which differs from the climatic climax due to soil conditions.

EPHEMERAL STREAM: A stream which only flows for a short time each year, as in response to snowmelt or rainstorms.

ETHNOGRAPHY: The anthropological description of living cultures.

FECAL COLIFORMS: An organism that is used as an indication of the possible presence of warm-blooded pathogens.

FIRE DISCLIMAX: Vegetation which has been differentiated by and attained an equilibrium with a particular frequency and intensity of burning.

FIXED COSTS: These are the costs associated with those inputs in the production process that are generally fixed in supply during a designated period of time. Costs of the following items are considered to be fixed in this study; land and property taxes, equipment and building repairs, fuel, insurance, and power for irrigation. Although the quantities of these inputs available to the rancher each year can be changed, their supply would not change automatically with changes in herd size on the individual ranches.

FOREGROUND-MIDDLEGROUND: The area visible from a travel route or use area to a distance of 3-5 miles. The outer boundary of this zone is defined as the point where texture and form of individual plants is no longer apparent in the landscape--vegetation is apparent only in patterns or outline.

FORM: The mass of an object(s) that appears unified.

HABITAT TYPE: The collective area, occupied by one vegetative association, which is the product of all ecological factors (soil, climate, topography, etc.) which produce it.

INFILTRATION: The entry of water into the surface layer of soil.

INTERIM MANAGEMENT: Guidelines set forth in Section 603C FLPMA for the protection of areas under wilderness review. These lands must be managed, "... in a manner so as not to impair the suitability of such areas for preservation as wilderness ..." (See December 12, 1979 Interim Management Policy and Guidelines for Lands under Wilderness Review.)

INTERMITTENT STREAM: A stream which flows only during the wet season.

INTRUSION: A feature (land, vegetation, or structure) which is generally considered out of context with the characteristic landscape.

INVADER: Plant species that were absent or present in very small amounts in undisturbed portions of the original vegetation of a specific range site and will invade following disturbance or continued overuse.

KEY AREA: A portion of range, which, because of its location, grazing, or browsing value, and/or use, serves as an indicative sample of range conditions, trend, or degree of seasonal use.

KEY MANAGEMENT SPECIES: Forage species on which management of grazing of a specific unit is based. Also called key species.

LACUSTRINE ADAPTATION: The orientation of a species or group to a lifeway based on the exploitation of lake-margin resources.

LAND ETHIC: A concept, put forward by Aldo Leopold, wherein a human being is part of a natural community rather than conqueror of it.

LANDSCAPE CHARACTER: The arrangement of a particular landscape as formed by the variety and intensity of the basic elements of form, line, color, and texture.

LIGHT GRAZING: A comparative term which indicates that the stocking rate of a pasture is relatively less than that of other pastures.

LINE: A point which has been extended; anything arranged in a row or sequence.

LITHIC: Pertaining to stone.

LIVESTOCK CLASS: The kind of domestic livestock which graze on range. It refers to cattle, sheep, or a combination. Class may be broken down further; cows with calves, yearlings, steers, ewes, ewes with lambs, lambs, etc.

LIVESTOCK DISTRIBUTION: The uniformity of livestock grazing use over a range area. It is affected by availability of water, by topography, and by type and palatability of vegetative species.

LIVESTOCK GRAZING LICENSE: An authorization which permits the grazing of a specified number and class of livestock on a designated area of BLM district grazing lands for a period of time, not to exceed one year.

LIVESTOCK OPERATION: The management of an area of land so that a significant portion of the income is derived from the continuing production of livestock.

LIVESTOCK OPERATOR: One who qualifies to graze livestock on public lands.

MODERATE GRAZING: A comparative term which indicates that the stocking rate of a pasture is between the rates of other pastures.

NATURAL AREA: An area where natural processes predominate and which is preserved for the primary purpose of research and education. Such areas may include (1) typical or unusual faunistic and/or floristic types, associations, or other biotic phenomena, or (2) characteristic or outstanding geologic or aquatic features and processes.

OBSIDIAN HYDRATION: An archaeological dating technique applied to volcanic glass. The technique is predicated on the gradual absorption of water in an ever-thickening layer on the surface of obsidians. The thickness of the hydration layer provides an index (although not an unequivocal one) of the age of the specimen.

OFF-ROAD VEHICLE (ORV): Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other terrain.

OPEN SITE: An archaeological site on open ground; that is most site categories except caves, rockshelters, and petroglyphs.

OPPORTUNITY COSTS: The income foregone by not taking advantage of opportunity to sell at a high price.

PASTURE: A subdivision of a grazing allotment on public lands.

PERENNIAL STREAM: A stream which flows throughout the year.

PRIMITIVE AREA: A natural, wild and undeveloped area essentially removed from the effects of civilization.

RANCH FUNDAMENTALISM: The persistence of a group of ranchers to continue in their given lifestyle despite the opportunities to sell their lands at a high price.

RANCH ADJUDICATION: The allocation of grazing allotments, season of use, numbers and class of livestock to qualified operators.

RANGE CONDITION: The present state of vegetation on a range site in relation to the climax (natural potential) plant community for that site.

RANGE FACILITY: A structure, such as reservoirs, fences, etc., that facilitates livestock grazing on public lands.

RECREATION ACTIVITY OCCASION: A standard unit of recreation use consisting of one individual participating in one specific outdoor recreation activity during any portion of one day. One individual participating in three different activities during one day is recorded as three activity occasions.

REFERENCE GROUP: Any group to which an individual refers for comparing, judging, or deciding upon his opinions and behaviors.

ROADLESS: "The absence of roads which have been improved or maintained by mechanical means to ensure relatively regular and continuous use. A way maintained solely by the passage of vehicles does not constitute a road" (House of Representatives Report 94-1163, in reference to the Federal Land Policy Management Act of 1976, P.L. 94-579).

SCENIC QUALITY: The quality of the scenery as determined through the use of the scenic evaluation process.

SEDENTARY: A settlement pattern characterized by year-round, year-after-year occupation of one site; contrasts with seasonal, transhumane, or migratory settlement.

SELDOM SEEN AREAS: Areas seen from low use volume transportation routes or beyond the 15-20 mile background zone for other routes.

SOCIO-CULTURAL GROUP: A social grouping or set of people who reside and interact together and share cultural beliefs.

STAND: A plant community representative of a particular association.

STOCKING RATE: The degree to which a grazing unit is stocked with livestock, usually expressed in AUMs. The stocking rate may be more or less than the carrying capacity of the grazing unit.

STORM RUNOFF: Runoff which occurs in response to rainfall. A 10-year storm runoff is one expected to occur on the average once every 10 years.

TEXTURE: The visual result of the tactile surface characteristics of an object.

TOPOEDAPHIC CLIMAX: Climax vegetation which differs from the climatic climax due to a combination of soil and topographic conditions.

TOPOGRAPHIC CLIMAX: Climax vegetation which differs from climatic climax due to topographic conditions.

TRANSHUMANCE: Seasonal shifting of activity centers from lowland to mountain settings.

VARIABLE COSTS: These are the costs faced by the producer arising from those inputs in the production process that can be changed during a designated, usually short, period of time. Inputs considered to be variable in this report are generally those inputs that will vary in response to changes in herd size. These include range permits, salt and minerals, labor, bull replacements, veterinary and medical needs, cattle head and possessory interest taxes, and short-term interest costs on these inputs.

VEGETATION ZONE: The entire area over which one vegetative association is climatic climax.

VISUAL PROMINENCE ZONE: The area that can be seen as foreground-middle-ground, background, or seldom seen areas.

VISUAL RESOURCE MANAGEMENT (VRM): The planning, design, and implementation of visual resource management classes for all BLM resource management activities.

VISUAL RESOURCE MANAGEMENT (VRM) CLASSES: The degree of alteration that is acceptable within the characteristic landscape. The classes are based upon the physical and sociological characteristics of any given homogeneous area.

VISUAL SENSITIVITY LEVEL: An index of the relative importance or value of visual response to an area in relation to other areas.

WILDERNESS STUDY AREAS: Roadless areas of 5,000 acres or more and roadless islands of public lands identified as having wilderness characteristics described in the Wilderness Act of 1964 (P.L. 88-577).

ZOOTIC DISCLIMAX: Vegetation that has been differentiated by and attained an equilibrium with a particular and degree of animal influence.

REFERENCES CITED

REFERENCES CITED

- Ames, C. R. 1977. Wildlife Conflicts in Riparian Management. Grazing, From Importance, Preservation and Management of Riparian Habitat. A Symposium. Fort Collins, Colo.: U. S. Dept. Ag., Rocky Mtn. Forest and Range Experiment Station, General Tech. Rept. Rm-43.
- Amesbury, R. H. 1967. Nobles' Emigrant Trail. Susanville, Ca., private printing.
- Anderson, E. W. 1978. "Range site handbook for the high desert resource province--Oregon." Unpublished report.
- Antevs, E. 1948. "Climatic changes and pre-white man." University of Utah Bulletin (Salt Lake City), vol. 38, p. 168-191.
- Autenwreith, R. E., ed. 1978. Guidelines for the Management of Pronghorn Antelope., in press.
- Baker, F. S. 1918. "Aspen reproduction in relation to management." Journal of Forestry, vol. 16, p. 389-398.
- Bayless, S. R. 1969. Winter food habits, range use, and home range of antelope in Montana. Journal of Wildlife Management 33(3):538-551.
- Bedwell, S. F. 1970. "Prehistory and environment of the pluvial Fort Rock area of south central Oregon." Unpublished Ph.D. dissertation, Dept. Anthropology, Univ. Oregon (Eugene).
- Bedwell, S. F. 1973. Fort Rock Basin: Prehistory and Environment. Eugene: Univ. Oregon.
- Berg, R. H. 1966. "Evaluation of selected Nevada deer ranges: condition, forage potential, and deer-livestock competition." Unpublished M.S. thesis, Univ. Nevada (Reno).
- Berryessa, Ed, personal communication, Sept. 21, 1978.
- Blaisdell, J. P. 1953. Ecological Effects of Planned Burning of Sagebrush-Grass Range on the Upper Snake River Plains. Washington, D.C.: U. S. Dept. Ag., Tech. Bulletin 1075.
- Blaisdell, J. P., and Mueggler, W. F. 1956a. "Effects of 2,4-D on forbs and shrubs associated with big sagebrush." Journal of Range Management, vol. 9, no. 1, p. 38-40.
- . 1956b. "Sprouting of bitterbrush (*Purshia tridentata*) following burning or top removal." Ecology, vol. 37, no. 2, p. 365-370.

- Boussu, M. F. 1954. "Relationship between trout populations and cover on a small stream." *Journal of Wildlife Management*, vol. 18, no. 2, p. 229-239.
- Braun, C. E., T. Britt, and R. O. Wallestad. 1977. Guidelines for maintenance of sage grouse habitats. *Wildlife Society Bulletin* 5:3, pp. 99-106.
- Buechner, H. K. 1947. "Range use of pronghorn antelope in western Texas." *Transcripts of the 12th North American Wildlife Conference*, vol. 12, p. 185-192.
- Burkhart, Wayne. Asst. Prof. Range Science, Univ. of Nevada, Reno, Nevada. Personal communication, January, 1976.
- Bushby, F. E. 1977. "Effects of livestock grazing on infiltration and erosion rates measured on chained and unchained pinyon-juniper sites in southeastern Utah." Unpublished Ph.D. dissertation, Utah State Univ. (Logan), 130 p.
- Buslovich, S., and Borushko, N. 1976. "Chlorine derivatives of phenoxyacetic acid as antagonists of thyroid hormones." *Formakol. Toksikol.*, vol. 39, p. 481-482.
- California Native Plant Society. 1974. *Inventory of Rare and Endangered Vascular Plants in California*: CNPS, Spec. Pub. No. 1.
- Corson, C. R. 1977. "Spatial patterning of small lithic scatters in northwestern Nevada," presented at the Annual Meeting of the Society for California Archaeology, San Diego: on file, Susanville, Ca., Bur. Land Management District Office.
- Cothern, James. 1977. "Livestock drought alternative series: Modoc County." Davis, Ca.: Univ. California, Ag. Extension Service computer printout.
- Countryman, C. M., and Cornelius, D. R. 1957. "Some Effects of fire on perennial range type." *Journal of Range Management*, vol. 10, no. 1 p. 39-41.
- Cressman, L. S., and others. 1942. *Archaeological Researches in the Northern Great Basin*. Washington, D. C.: Carnegie Inst. of Washington, Pub. No. 538.
- Davis, J. O. and Elston, R. 1972. "New stratigraphic evidence of Late Quaternary climate change in northwestern Nevada," in *Great Basin Cultural Ecology: A Symposium*, D. D. Fowler, ed. Reno, Las Vegas: Desert Research Inst., *Publications in the Social Sciences* 8, p. 43-56.

- Davis, W. N., Jr. 1974. "Sagebrush corner: the opening of California's northeast." Garland American Indian Ethnohistory Series, California Indians V. New York, London.
- Delano, A. 1936. Across the Plains and Among the Diggings. New York: Wilson-Erickson.
- Demarchi, R. 1975. "Report and recommendations of the workshop on California bighorn sheep," in Wildsheep in Modern North America, New York: Winchester Press.
- Dost, F. N. 1978. Toxicology of Phenoxy Herbicides and Hazard Assessment of Their Use in Reforestation. U. S. Dept. A., Forest Service, p. 59-76.
- Eakin, T. E., and others. 1951. Contribution to the Hydrology of Eastern Nevada. Reno: Nev. State Engineer, Water Resources Bulletin 12, 171 p.
- Edminster, F. C. 1954. American Game Birds of Field and Forest. New York: Charles Scribner and Sons, 409 p.
- Eng, R. L., and Schladweiler, P. 1972. "Sage grouse winter movements and habitat use in central Montana." Journal of Wildlife Management, vol. 36, no. 1, p. 141-146.
- Fee, L. 1966. "Modoc County cattle history." Journal of Western Cattleman's Association, December 1966.
- Feirel, C. M., and Leach, H. R. 1950. "Food habits of the pronghorn antelope of California." California Dept. Fish and Game, vol. 39, no. 3, p. 301-341.
- Fenneman, N. M., and others. 1946. Physical Division of the United States. Reston, Va.: U. S. Dept. Interior, Geol. Survey map, scale 1:7,000,000.
- Gifford, G. F., and Hawkins, R. H. 1978. "Hydrologic impact of grazing on infiltration: a critical review." Water Resources Research, vol. 14, p. 305-313.
- Gill, R. B. 1965. "Distribution and abundance of a population of sage grouse in North Park, Colorado." Unpublished M.S. thesis, Colorado State Univ. (Fort Collins), 187 p.
- Goldman, George, and others. 1974. Lassen County Economic and Resource Use Study for Base Year 1971. Berkeley: Univ. California, Cooperative Extension, 34 p.

- Grinnell, J. and A. H. Miller. 1944. The Distribution of the Birds of California. Cooper Ornithological Club. Berkeley, Calif.
- Hall, R. E. 1946. Mammals of Nevada. Berkeley: Univ. California Press.
- Harris, Harold, personal communication, Oct. 19, 1978.
- Heady, H. F., and Bartolome, J. 1977. Vale Rangeland Rehabilitation Program: The Desert Repaired in Southeastern Oregon. Portland, Ore.: U. S. Dept. Ag., Forest Service, Resource Bulletin PNW-70.
- Heffernan, W. D. 1972. "Sociological dimensions of agricultural structures in the United States." *Sociologia Ruralis*, vol. XII, no. 3/4, p. 481-499.
- Heizer, R. F., and Baumhoff, M. A. 1962. Prehistoric Rock Art of Nevada and Eastern California. Berkeley: Univ. California Press.
- Hester, T. R. 1973. "Chronological ordering of Great Basin prehistory." Contributions of the University of California Archaeological Research Facility 17. Berkeley.
- Hill, Ed, personal communication, Oct. 20, 1978.
- Hines, Brad, Range Conservationist, Winnemucca, Nev., District Office, Bur. Land Management. Personal communication, Sept. 21, 1978.
- Hormay, A. L. 1943. Bitterbrush in California. Berkeley: U. S. Dept. Ag., Forest Service, Pacific Southwest Forest and Range Experiment Station, Research Note No. 34, 13 p.
- . 1970. Principles of Rest Rotation Grazing and Multiple-Use Land Management. Berkeley: U. S. Dept. Interior, Bur. Land Management, and U. S. Dept. Ag., Forest Service, 26 p.
- . 1978. Natural Resource Specialist, Pacific Southwest Forest and Range Experiment Station, Forest Service, U. S. Dept. Ag. Personal communication, 1978.
- Houghton, J. G., Sakamoto, C. M., and Gifford, R. O. 1975. Nevada's Weather and Climate. Reno: Univ. Nevada, Mackay School of Mines, and Nevada Bur. Mines and Geology, Special Pub. 2.
- Hunt, T. H. 1974. Ghost Trails to California. Palo Alto, Ca.: American West Publishing Co.
- Hussa, Walter, personal communication, Sept. 19, 1978.
- Hutchins, Lee, personal communication, Sept. 14, 1978.

- Hyde, D. O. 1973. Last Free Man: The True Story of the Massacre of Shoshone Mike and His Band of Indians in 1911. New York: Dial Press.
- Hyder, D. N. and W. A. Sawyer. 1951. Rotation-Deferred Grazing as Compared to Season Long Grazing on Sagebrush-Bunchgrass Ranges in Oregon. J. Range Mgt. 4 (11):30.
- Hyder, D. N., and Shiva, F. A. 1962. "Selective control of big sagebrush associated with bitterbrush." Journal of Range Management, vol. 15, no. 4, p. 211-215.
- Jennings, J. D. 1964. "Desert west," in Prehistoric Man in the New World, J. D. Jennings and E. Norbeck, eds. Chicago: Univ. Chicago Press, p. 149-174.
- Junker, H. 1968. "Getting down to the nitty gritty." Saturday Evening Post, Nov. 2, 1968, p. 42-47.
- Kelly, I. T. 1932. "Ethnography of the Surprise Valley Paiute." University of California (Berkeley), Publications in American Archaeology and Ethnology, vol. 31, p. 67-210.
- King, N. J. 1971. "Watershed management," presented to the Bureau of Land Management, Salt Lake City, Utah.
- King N. J., and Snyder, C. T. 1957. "Hydrology of the Public Domain: stockwater development in the Massacre Lake." Unpublished U. S. Geol. Survey Water Supply Paper.
- Klebenow, D. A., and Gray, C. M. 1968. "Food habits of juvenile sage grouse." Journal of Range Management, vol. 21, no. 2, p. 80-83.
- Knight, G. C. 1976. "Sociocultural groups and values of the Winnemucca District, BLM." Winnemucca, Nev.: U. S. Dept. Interior, Bur. Land Management.
- Kroeber, A. L. 1939. "Cultural and natural areas of native North America." University of California (Berkeley), Publications in American Archaeology and Ethnology, vol. 38.
- Larrison, E. J., and Johnson, D. R. 1973. "Density changes and habitat affinities of rodents of shadscale and sagebrush associations." Great Basin Naturalist, vol. 33, no. 4, p. 255-264.
- Layton, T. N. 1966. "Archaeology of Smokey Creek Cave, Humboldt County, Nevada:26-HU-46." Unpublished M.A. thesis, Dept. Anthropology, Univ. California (Davis).

- Layton, T. N. 1970. "High Rock archaeology: an interpretation of the prehistory of the northwestern Great Basin." Unpublished Ph.D. dissertation, Dept. Anthropology, Harvard Univ. (Cambridge).
- . 1972. "A 12,000 year obsidian hydration record of occupation, abandonment and lithic change from the northwestern Great Basin." Tebiwa (Pocatello, Id.), vol. 15, p. 22-28.
- . 1977. "Massacre: what massacre? An inquiry into the massacre of 1850." Nevada Historical Society Quarterly, vol. XX, no. 4, p. 241-251.
- . 1978. "Indian rustlers of the High Rock." Archaeology, vol. 31, no. 2, p. 366-373.
- Lierle, Doug. 1978. Livestock--Western Edition, August.
- Lushby, G. C. 1970. Hydrologic and Biotic Effects of Grazing Versus Nongrazing Near Grand Junction, Colorado. Reston, Va.: U. S. Dept. Interior, Geol. Survey, Professional Paper 700-B, pp. B232-B326.
- Mack, E. M. 1968. Indian Massacre of 1911 in Little High Rock Canyon, Nevada. Sparks, Nev.: Western Printing and Publishing Co.
- Martin, N. S. 1970. "Sagebrush control related to habitat and sage grouse occurrence." Journal of Wildlife Management, vol. 34, no. 2, p. 313-320.
- Maser, C., ed. 1974. "Sage vole, *Lagurus curtatus*, in the Crooked River National Grassland, Jefferson County, Oregon. A contribution to its life history and ecology." Saugerturkudliche Mitterlugen, vol. 3, p. 193-222.
- McGonagle, R. L. 1974. "Time and space distribution of prehistoric occupation of the High Rock Lake locality, northwest Nevada." Unpublished Ph.D. dissertation, Univ. Missouri.
- McKenzie, Lester. Planning Director, Modoc County, California. Personal communication, Sept. 23, 1977.
- Meeuwig, R. O. 1970a. "Infiltration and soil erosion as influenced by vegetation and soils in northern Utah." Journal of Range Management, vol. 23, p. 185-188.
- . 1970b. Sheet Erosion on Intermountain Summer Ranges. U. S. Dept. Ag., Forest Service, Research Paper INT-85.

- Monson, G. 1941. "Effect of revegetation on the small bird population in Arizona." *Journal of Wildlife Management*, vol. 5, no. 4, p. 395-397.
- Morton, . 1967. *Weeds*, vol. 15, p. 268-271.
- Modoc County. 1974. *General Plan: Natural Resource Elements*. Alturas, Ca. 1974. 114 p.
- . 1977. "Modoc housing statistics." Alturas, Ca.: Modoc County, Dept. Public Works (mimeographed).
- . 1978. *Modoc County Agricultural Report - 1977*. Alturas, Ca.: Modoc County, Ag. Commissioner's Office.
- Modoc County, Road Department, personal communication 1978.
- Mueggler, W. F. 1975. "Rate and pattern of vigor recovery in Idaho fescue and bluebunch wheatgrass." *Journal of Range Management*, vol. 28, p. 198-204.
- Mundinger, J. D. 1976. "Waterfowl response to rest-rotation grazing." *Journal of Wildlife Management*, vol. 40, no. 2, p. 60-68.
- Nevada Department of Fish and Game. 1975. *Guidelines for Habitat Protection in Sage Grouse Range*. Nev. Dept. Fish and Game.
- Nevada Department of Fish and Game. 1978a. "Wildlife Habitat Management Plans for the Future." *Input to Land Management Agencies' Planning Systems, Cowhead/Massacre Units*. Project W-48, 55 p.
- . 1978b. *Regional wildlife input planning report*. Cowhead/Massacre Planning Unit.
- Nevada Department of Parks and Recreation. 1977. *Statewide Outdoor Recreation Plan*. Nev. Dept. Parks and Rec.
- Norris, . 1971. *Journal of Forestry*, vol. 69, p. 715-720.
- Oakleaf, R. J. 1971. "Relationship of sage grouse to upland meadows in Nevada." Nev. Dept. Fish and Game, Final Rept. W-48-2, 64 p.
- O'Brien, Tom. 1977. *Personal Interview with Dave Lambert, Economist, Susanville, Ca., at Production Credit Association, Alturas, Ca., Oct. 21, 1977*.
- O'Connell, J. F. 1971. "Archaeology and cultural ecology of Surprise Valley, northeast California." Unpublished Ph.D. dissertation, Dept. anthropology, Univ. California (Berkeley).

- O'Connell, J. F. 1975. Prehistory of Surprise Valley. Romona, Ca.: Ballena Press, Anthropological Papers, No. 4.
- O'Connell, J. F., and Ambro, R. D. 1968. "Preliminary report on the archaeology of the Rodriguez Site (CA-LAS-194), Lassen County, California." University of California (Berkeley), Archaeology Survey Report, vol. 73, p. 95-194.
- O'Connell, J. F., and Ericson, J. E. 1974. "Earth lodges to wickiups: a long sequence of domestic structures from the northern Great Basin." Reno: Nevada Archaeological Survey Research papers, vol. 5, p. 44-61.
- O'Connell J. F., and Hayward, P. S. 1972. "Altithermal and medithermal adaptations in Surprise Valley, northwest California," in Great Basin Cultural Ecology: A symposium, D. D. Fowler, ed. Reno: Desert Research Inst., Publications in the Social Sciences, vol. 8, p. 25-42.
- Olmstead, p. 1957. "Nevada-California-Oregon border triangle: a study in sectional history." Unpublished M. A. thesis, Univ. Nevada (Reno).
- Pacific Southwest Interagency Committee, Water Management Subcommittee. 1968. "Factors affecting sediment yield in the Pacific Southwest area and selection and evaluation of measures for reduction of erosion and sediment yield." Portland: PSIAC (mimeographed).
- Page, J. L., N. Dodd, T. O. Osborne, and J. A. Carson. 1978. The Influence of Livestock Grazing on Non-Game Wildlife.
- Parman, Joe and Parman, Bettie, personal communication, Aug. 2, 1978.
- Patterson, R. L. 1952. The Sage Grouse in Wyoming. Sage Books, Inc. Denver. 341 pp.
- Pauzi, R., and Hanson, C. L. 1966. "Water intake and runoff as affected by intensity of grazing." Journal of Range Management, vol. 19, no. 6, p. 355.
- Pechnac, J. F., and Stewart, George. 1954. Sagebrush Burning--Good and Bad. U. S. Dept. Ag., Farmers Bulletin 1948.
- Peterson, J. F. 1970. "Food habits and summer distribution of juvenile sage grouse in central Montana." Journal of Wildlife Management, Vol. 34, no. 1, p. 147-155.
- Pierce, Cecil, Modoc County, California, Farm Advisor. Personal communication, 1978.

- Pierce, Cecil. 1979. "Economics and the Public Lands--Modoc County, 1979. Mimeograph, Alturas, Ca. June 1, 1979.
- Platts, W. S. 1977. "Livestock interactions with fish and their environments," presented to California-Nevada Section, Society of Range Management Meeting, Nevada, 12 p.
- Plumb, T. R., Norris, L. A., and Montgomery, M. L. 1977. "Persistence of 2,4-D and 2,4,5-T in chaparral soil and vegetation." Bulletin of Environmental Contamination Toxicology, vol. 17, no. 1.
- Plummer, A. P., and others. 1954. Seeding Rangelands in Utah, Nevada, Southern Idaho and Western Wyoming. Washington, D. C.: U. S. Govt. Printing Office, Agriculture Handbook #71.
- Pratt, Regina, personal communication, Oct. 2, 1978.
- Pyshora, L. 1977. Pronghorn Antelope in Northeastern California. Wildlife Mgmt. Admin. Rept. No. 77-2, 46 p.
- Ratliff, R. D. and J. N. Reppert. 1974. Vigor of Idaho Fescue Grazed under Rest-Rotation and Continuous Grazing. J. Range Mgt. 27(6):447.
- Read, G., and Gains, R. 1949. Gold Rush: The Journals, Drawings, and Other Papers of J. Goldsborough Bruff. New York: Columbia Univ. Press.
- Reed, Doyle. 1977. "Sample costs to produce alfalfa--wheel line sprinkler irrigation, Modoc County--1977." Davis, Ca.: Univ. California, Cooperative Ext. Service.
- . 1978. University of California (Davis), Cooperative Extension Service. Personal communication, Aug. 1978.
- Robertson, J. H. 1971. "Changes on a sagebrush-grass range in Nevada ungrazed for 30 years." Journal of Range Management, vol. 24, p. 397-400.
- Roney, J. 1977. "Livestock and lithics: the effects of trampling." Winnemucca, Nev.: U. S. Dept. Interior, Bur. Land Management.
- Sampson, A. W. 1919. Effect of Grazing Upon Aspen Reproduction. U. S. Dept. Ag., Bulletin No. 741.
- Savage, D. E. 1969. "Relation of sage grouse to upland meadows in Nevada." Nev. Dept. Fish and Game, Job Progress Rept. W-39-R-9, 101 p.

- Savage, J. A. 1977. "Effects on wildlife of herbicide-induced habitat change, Tahoe National Forest, California." Unpublished M.A. thesis, Univ. California (Berkeley).
- Schadler, Lonnie, personal communication, Oct. 26, 1978.
- Schreiber, H. A., and Renard, K. G. 1978. "Runoff water quality from varying land uses in southeastern Arizona." Journal of Range Management, vol. 31, p. 274-279.
- Selleck, D. M., and Hart, C. M. 1957. "Calculating the percentage of kill from sex and age ratios." Calif. Dept. Fish and Game, vol. 43, no. 4.
- Shanks, Bernard. 1976. "Characteristics of northeastern California deer hunters: a report to the Bureau of Land Management." Reno: Univ. Nevada, Renewable Resource Center.
- Sheets, T. J., and Danielson, L. L. 1960. Herbicides in Soil. Washington, D. C.: U. S. Dept. Ag., Ag. Research Service, Tech. Rept. No. ARS-20-9, p. 170.
- Sinclair, W. C. 1963. Ground-water Appraisal of the Long Valley/Massacre Lake Region, Washoe County, Nevada. Carson City: Nev. Dept. Conservation and Natural Resources, Ground-water Resources Reconnaissance Series, Rept. 15.
- Smith, A. H., and Martin, W. E. 1972. "Socioeconomic behavior of cattle ranchers, with implications for rural community development in the West." American Journal of Agricultural Economics, vol. 54, no. 2, p. 217-225.
- Sneva, F. A. and D. N. Hyder. 1962. Estimating Herbage Production on Semiarid Ranges in the Intermountain Region. J. Range Mgmt. 15(2):88.
- Sokolow, A. D. 1977. "California's new migration to the towns of the 'cow countries'." California Journal, vol. 8, no. 10, p. 348-350.
- Squaw Butte Experimental Station, 1965. Research in Beef Cattle Nutrition and Management. Agricultural Extension Service, Oregon State Univ., Burns, Ore. March, 1965.
- Summerfield, H. B., Jr., personal communication, 1978.
- Summerfield H. G., Jr., and others. 1974. Soil Survey of Surprise Valley-Home Camp Area, California-Nevada. Washington, D. C.: U. S. Dept. Ag., Soil Conservation Service and Forest Service; U. S. Dept. Interior, Bur. Land Management; Univ. California; and Univ. Nevada; 130 p.

- Trlica, M. J., Buwai, M., and Menke, J. 1977. "Effects of rest following defoliation on the recovery of several range species." *Journal of Range Management*, vol. 30, p. 21-27.
- Tsukamota, George. 1977. "Program and procedure, mule deer population estimate." Nev. Dept. Fish and Game, Job Completion Rept. W-48, Job A-8, 11 p.
- Tsukamota, George, and Riebert, W. J. 1948. "Preliminary report of Nevada pronghorn antelope food habits during August and September," in *Transactions of the Interstate Antelope Conference*, Lakeview, Oregon.
- Tueller, P. T. and J. D. Tower. 1979. *Vegetation Stagnation in Three-Phase Big Game Enclosures*. *J. Range Mgt.* 32:258-263.
- Tueller, P. T., and Monroe, L. A. 1974. "Management guidelines for selected deer habitats in Nevada." Univ. Nevada, Ag. Experiment Station, Pub. No. R104, p. 185.
- U. S. Congress, Senate Special Committee to Study Problems of American Small Business. 1946. *Small Business and the Community, a Study in Central Valley of California on Effects of Scale of Farm Operations*. 79th Cong., 2nd Sess., Senate Rept. No. 13.
- U. S. Department of Agriculture, Agricultural Research Service. 1972.
- U. S. Department of Agriculture, Soil Conservation Service. 1977. *Advance Soil Survey. Washoe County, Nevada. North Part (759)*. Washington, D. C.: Government Printing Off.
- U. S. Department of Commerce, Bureau of the Census. 1974. *U. S. Census of Agriculture*. Washington, D. C.: Government Printing Off., vol I, part V.
- U. S. Department of the Interior, Bureau of Land Management. 1973. "Deer hunt survey." Unpublished report. BLM, Susanville, Ca., District Office.
- . 1974. "Consumptive water requirements for public lands administered by the BLM. Western U. S. water plan." Unpublished working document. BLM, Susanville, Ca., District Office.
- . 1977a. "Cowhead/Massacre Unit Resource Analysis." Unpublished data. BLM, Susanville, Ca., District Office.
- . 1977b. "Dietary analysis of cattle, sheep, horses, deer, and antelope." Unpublished data. BLM, Susanville, Ca., District Office.

- U. S. Department of the Interior, Bureau of Land Management. 1978a.
"Cowhead/Massacre Planning Unit, Planning Area Analysis." Unpublished
report. BLM, Susanville, Ca., District Office.
- . 1978b. Proposed Livestock Grazing Management for the Tuledad/Home
Camp Planning Unit. Final Environmental Impact Statement. BLM,
Susanville, Ca., District Office.
- University of California, Agricultural Extension Service. 1968. Beef
Cattle Production Costs for Lassen and Modoc Counties. Davis, Ca.:
Univ. Calif., p. 2-3.
- . 1972. "Beef Cattle Production Costs in Modoc County." Davis, Ca.:
Univ. Calif., p. 12.
- . 1977. Modoc Ranch Roundup--Cattle Ranch Cost Study. Alturas, Ca.:
Modoc County Farm Advisor's Office, p. 3.
- . 1978a. "Income and expense--cow/calf and cow/yearling operations
for Surprise Valley," Modoc County Farm Advisor's Office (mimeographed).
- . 1978b. "Cost of grazing cattle on BLM permits--estimated costs for
1978." Modoc County Farm Advisor's Office (mimeographed).
- Utah Agricultural Experiment Station. 1976. Use of Prescribed Burning
in Western Woodland and Range Ecosystems. A Symposium. Logan:
Utah State Univ.
- Valentine, J. F. 1971. Range Development and Improvements. Provo, Utah,
Brigham Young Univ. Press, chaps. 5-6.
- Vorhies, C. T. and W. P. Taylor. 1940. Life History and Ecology of
the White-Throated Woodrat, Neotoma albigula, in Relation to
Grazing in Arizona. Univ. of Ariz. coll. Tech. Bull. No. 86:453-529.
- Wallestad, R. O. 1971. "Summer movements and habitat use by sage grouse
broods in central Montana." Journal of Wildlife Management, vol.
35, no. 1, p. 129-136.
- . 1975. Male Sage Grouse Response to Sagebrush Treatment. J.
Wldl. Mgt. 39:482-484.
- Wallestand, R. O., and Pyrah, D. B., 1974. "Movement and nesting requirements
of sage grouse hens in central Montana." Journal of Wildlife
Management.
- Washoe County, Nevada Road Department. Personal communication, August
1977.

- Watanabe, Jean. 1975. An Economic Profile: Bureau of Land Management, Susanville District. December 1975.
- Weber, T. F., Peak, A. S., and Gerry, R. A. 1977. Cultural Resource Survey of the Pacific Northwest-Pacific Southwest Interior, Western Nevada, Clark County to Oregon Border. Boulder City, Nev.: Dept. Interior, Bur. Reclamation, Lower Colorado Region.
- Williams, M. C. 1970. "Detoxification of timber milkvetch by 2,4,5-T and silvex." Journal of Range Management, vol. 23, no. 6, p. 400-402.
- Winegar, H. H. 1977. "Camp Creek channel fencing--Plant, wildlife, soil, and water response." Rangeman's Journal, vol. 4, no. 1, p. 10-12.
- Woody, J. B. "Recreational use of isolated rangelands in northwestern Nevada." Unpublished M.S. thesis, Univ. Nevada (Reno).
- Young, J. A., and Evans, Raymond. 1978. "Population dynamics after wildfire in sagebrush grasslands." Journal of Range Management, vol. 31, no. 4, p. 283-289.

APPENDICES



Appendix A

LIVESTOCK CARRYING CAPACITY AND STOCKING RATES

Livestock carrying capacities as presented throughout this document were determined using the initial stocking rate guides for ecological sites (Anderson, 1978). These data provide an approximate capacity under present vegetative conditions as well as under future improved vegetative conditions. Carrying capacities are determined by using the average recommended stocking rates for low and high production years for each ecological site in their respective condition classes. For example: if 1,000 acres of ecological site 5 are presently in fair condition, and 500 acres of ecological site 13 are presently in poor condition within an allotment, the allotment capacity would be determined as follows: 1,000 acres at 10 acres/AUM = 100 AUMs 500 acres at 13 acres/AUM = 38 AUMs Total = 138 AUM capacity.

The capacity of individual ecological sites is shown on TABLE A-1.

As stated in Chapter 1, ("Carrying Capacity"), initial stocking rates were determined through actual use and utilization data in context with the type of grazing system proposed, rather than directly from livestock carrying capacity data.

TABLE A-1

LIVESTOCK GRAZING CAPACITY OF ECOLOGICAL SITES 1/

C O N D I T I O N C L A S S
(Acres/AUM)

<u>Ecological Site</u>	<u>Poor</u>	<u>Fair</u>	<u>Good</u>	<u>Excellent</u>
1	48			
2	21	4		
3	Unknown			
4		43	17	
5		10	4	
6		19	10	
7	42	9		
8		10		
9	42	7		
10		10	3	
11	42	7		
12		10	5	
13	12	5	2	
14		10	5	
15	Unknown	<u>2/</u>	<u>2/</u>	
16	Unknown	<u>2/</u>	<u>2/</u>	
17	5	3	1	
18	4	1	1	$\frac{1}{2}$
19	4	1	1	$\frac{1}{2}$
Misc				

1/ Figures are averages of low and high production years.

2/ No acreages presently or predicted to be in these condition classes.

Source: W. E. Anderson, 1978. Range Site Handbook for the High Desert Resource Province. Oregon.

Appendix B

VEGETATIVE CONDITION AND TREND STUDIES

Information on present vegetative condition and trend was obtained from inventories conducted during June-September 1977.

VEGETATIVE CONDITION

The vegetative inventory (described below) consisted of sampling ecological sites within soil mapping units delineated in the Advance Soil Survey, Washoe County, Nevada, North Part (759) (USDA, SCS - 1977). Vegetative composition data were obtained based on canopy cover. Since the potential vegetative composition of range sites developed in conjunction with the soil survey were based on species composition by weight, it was necessary to correlate these range site descriptions with range site descriptions based on composition by canopy cover.

To accomplish this, SCS range sites were correlated to range site descriptions developed for the High Desert Resource Province, Oregon (Anderson, 1978) by comparing site characteristics (i.e., soils, physiographic location, topography, slope, and vegetation). Although Anderson's ecological site descriptions were not developed directly for the study area, they were developed on an area exhibiting similar site conditions immediately north of the study area. They have been used by the U. S. Fish and Wildlife Service in developing resource management plans on the Charles Sheldon Antelope Range, immediately east of the study area. It is felt that they are applicable to vegetation in the study area.

The vegetative composition of shrub and meadow communities was determined by sampling canopy cover using a modification of procedures developed by Daubenmire (1959). The canopy coverage of herbaceous species was estimated in thirty 0.1 meters squared quadrats located at five-foot intervals along transect lines. The canopy coverage of shrub species was determined by estimating canopy cover on 80 quadrats along the transect line.

The vegetative composition of aspen communities was sampled using a modification of Daubenmire's (1968) system of nested plots. Density of trees by diameter at breast height (root crown diameter for mountain mahogany) size classes was determined in a 15 meters x 25 meters plot. Canopy coverage and frequency of understory species were estimated according to procedures previously described for shrub and meadow communities.

The condition and trend of bitterbrush ranges were determined using the 1/13 acre belt transect method (USDA, Forest Service, 1969).

The present ecological condition of sites was determined by comparing the present vegetative composition to the potential vegetative composition and determining what degree of departure from climax exists. For example: if, at climax, the canopy cover of a site consists of 75 percent cover of bluebunch wheatgrass and 25 percent cover of sagebrush and the site presently contains 80 percent cover of sagebrush and 20 percent cover of bluebunch wheatgrass, that portion of the present $v\frac{1}{2}$ vegetative community present under climax conditions is 25 percent sagebrush and 20 percent bluebunch wheatgrass. Therefore, the present vegetative community represents only 45 percent of what exists at climax. Using 0-25 percent of climax "poor," and 26-50 percent as "fair," the present condition of this site would be "fair."

VEGETATIVE TREND

The vegetative trend within the study area was assessed by several methods. Existing photo trend plots established in 1969 when the Massacre Lake and Crooks Lake AMPs were implemented were evaluated. Trend was determined by comparing the initial trend index (a combination of percent composition of key species, live cover, number of seedlings, and amount of litter) with the trend index during 1977. A change of 5 percent or less in trend index was recorded as being "static" while a change greater than 5 percent was recorded as being "upward" or "downward."

The trend of seven previously established "Parker-3-Step" transects was determined by assessing changes in plant density, species composition and age class, vigor and condition of major forage plants, and soil erosion conditions.

The trend of bitterbrush ranges was determined on the basis of age and form class according to procedures outlined in the Range Environmental Analysis Handbook (USDA, Forest Service, 1969).

The trend of aspen communities was determined by assessing the frequency distribution of trees within various diameter size classes.

APPENDIX C

Ecological Site Characteristics

APPENDIX C

ECOLOGICAL SITE CHARACTERISTICS

ECOLOGICAL SITE	PHYSIOGRAPHIC LOCATION	SOIL CHARACTERISTICS	REPRESENTATIVE SOIL SERIES	CLIMAX VEGETATION	PRESENT VEGETATION
1) Shadscale/Indian Ricegrass	Gently rolling or sloping areas adjacent to major lakebeds. 4300-5000 ft. elevation. Precipitation is less than 8".	Formed from windblown materials from adjacent lakebeds. Surface layers are sandy, sub-soils are loamy. Soils are salt & alkali affected.	Raglan very fine sandy loam; Survoza fine sandy loam.	<p>Canopy Cover:</p> <p>Grass 35%</p> <p>Forbs 5%</p> <p>Shrubs 20%</p> <p>Bare Ground 30-40%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Indian Rice-grass 15%</p> <p>Needlegrass 10%</p> <p>Squirreltail 5%</p> <p>Shadscale 5%</p> <p>Rabbitbrush 5%</p> <p>Big Sagebrush 5%</p>	<p>Canopy Cover:</p> <p>Grass 1%</p> <p>Forbs 1%</p> <p>Shrubs 23%</p> <p>Bare Ground 65%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Shadscale 13%</p> <p>Greasewood 6%</p> <p>Spiny Hopsage 5%</p>
2) Greasewood/Basin Wildrye	Nearly flat bottoms of lake basins, flood plains & level terraces. 4100 to 5500 ft. elevation. Annual precipitation is 5" to 16".	Surface layers are medium textured & sub-soils are medium to moderately fine textured. Soils are slowly permeable. They are salt & alkali affected.	Hussa Loam, slightly saline-alkali; Tolak silty clay wet; & Tolak-Zorravista association.	<p>Canopy Cover:</p> <p>Grass 60%</p> <p>Forbs 5%</p> <p>Shrubs 35%</p> <p>Bare Ground 20%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Basin Wildrye 25%</p> <p>Streambank Wheatgrass 15%</p> <p>Western Needlegrass 10%</p> <p>Saltgrass 10%</p> <p>Greasewood 10%</p> <p>Rabbitbrush 10%</p> <p>Big Sagebrush 10%</p>	<p>Canopy Cover:</p> <p>Grass 1%</p> <p>Forbs 1%</p> <p>Shrubs 18%</p> <p>Bare Ground 67%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Greasewood 17%</p> <p>Big Sagebrush 1%</p> <p>Shadscale 1%</p>

ECOLOGICAL SITE CHARACTERISTICS

ECOLOGICAL SITE	PHYSIOGRAPHIC LOCATION	SOIL CHARACTERISTICS	REPRESENTATIVE SOIL SERIES	CLIMAX VEGETATION	PRESENT VEGETATION
3) Greasewood-Rabbitbrush/ Basin Wildrye	Northern & Eastern edges of dry lakebeds.	Soils consist of material blown off lakebeds & deposited in a series of narrow, low ridges or mounds or sand dunes. They are susceptible to blowing. Subsoils are medium textured. Soils are usually calcareous & may be alkaline.	Zorravista fine sand.	Age & stability of wind blown soils & variable alkalinity & available soil moisture cause the vegetation to vary widely in density & composition from one location to another. Canopy Cover: Grass 5-20% Forbs 0-5 % Shrubs 30-50% Bare Ground 40-80%	Because of the extreme variability of this site, it was not sampled during 1977. The present vegetation is dominated by greasewood & rabbitbrush. The present condition is probably similar to sites 1 & 2.
Dominant Species:					
Greasewood Green Rabbitbrush Basin Wildrye Streambank Wheatgrass					
4) Low Sagebrush/ Sandberg bluegrass	Gently sloping tablelands at elevations from 5600-7000 ft. Annual precipitation is 10" to 16".	Surface layers are loamy & are underlain by thick clay subsoils which restrict root development.	Espil gravelly sandy loam & fertiline gravelly fine sandy loam.	Canopy Cover: Grass 20% Forbs 10% Shrubs 25% Bare Ground 5-30%	Canopy Cover: Grass 7% Forbs 7% Shrubs 18% Bare Ground 44%
Dominant Species					
(% Canopy Cover):					
Low Sagebrush 20%					
Sandberg bluegrass 10%					
Squirreltail 5%					
Dominant Species					
(% Canopy Cover):					
Low Sagebrush 17%					
Sandberg bluegrass 4%					
Phlox 2%					
Squirreltail 1%					
Lava Aster 1%					
Rayless daisy 1%					
Sandwart 1%					

APPENDIX C (Continued)

ECOLOGICAL SITE CHARACTERISTICS

ECOLOGICAL SITE	PHYSIOGRAPHIC LOCATION	SOIL CHARACTERISTICS	REPRESENTATIVE SOIL SERIES	CLIMAX VEGETATION	PRESENT VEGETATION
5) Low Sagebrush/ Wheatgrass	Nearly level table-lands, terraces & fans at elevations from 5800-7000 ft. Annual precipitation 10" to 12".	Cobbly loam underlain by dense clay pan at depths of 15" to 18" which restricts root growth & available moisture.	Catnip extremely cobbly loam; 9 Mile extremely cobbly loam, & Tomey extremely cobbly loam.	<p>Canopy Cover:</p> <p>Grass 40%</p> <p>Forbs 10%</p> <p>Shrubs 10%</p> <p>Bare Ground 10-20%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Bluebunch Wheat-grass 20%</p> <p>Sandberg blue-grass 10%</p> <p>Low Sagebrush 10%</p>	<p>Canopy Cover:</p> <p>Grass 7%</p> <p>Forbs 6%</p> <p>Shrubs 25%</p> <p>Bare Ground</p> <p>Dominant Species (% Canopy Cover):</p> <p>Low Sagebrush 24%</p> <p>Sandberg blue-grass 4%</p> <p>Rabbitbrush 1%</p> <p>Squirreltail 1%</p> <p>Juniper 0-10%</p>
6) Low Sagebrush/ Idaho fescue	High, exposed, wind-swept ridges and plateaus above 6500 ft. elevation. Slope varies from 2-15% & annual precipitation is 12" to 16".	Shallow & have a high gravel & cobblestone content & low available water capacity. Persistent winds make these soils droughty.	Bregar rocky loam.	<p>Canopy Cover:</p> <p>Grass 35%</p> <p>Forbs 5%</p> <p>Shrubs 30%</p> <p>Bare Ground 2-5%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Low Sagebrush 25%</p> <p>Idaho fescue 15%</p> <p>Sandberg blue-grass 10%</p>	<p>This site was not sampled during 1977. Its present condition is estimated to be "fair." Present vegetation consists of low sagebrush & Sandberg bluegrass.</p>

APPENDIX C (Continued)

ECOLOGICAL SITE CHARACTERISTICS

ECOLOGICAL SITE	PHYSIOGRAPHIC LOCATION	SOIL CHARACTERISTICS	REPRESENTATIVE SOIL SERIES	CLIMAX VEGETATION	PRESENT VEGETATION
7) Low Sagebrush-Juniper/Bluebunch Wheatgrass	Prominent hills, ridges & plateaus with slopes from 2-20%. Elevation is 4300-5000 ft. & annual precipitation is 9" to 11".	Medium textured surface layers & moderately fine to fine textured subsoils. Rocky throughout & low escarpments of bedrock are common.	Newlands very cobbly loam & Mendiboure very stony loam.	<p>Canopy Cover:</p> <p>Grass 50%</p> <p>Forbs 10%</p> <p>Shrubs 10%</p> <p>Trees 5%</p> <p>Bare Ground 10-15%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Bluebunch Wheatgrass 20%</p> <p>Idaho fescue 10%</p> <p>Sandberg bluegrass 10%</p> <p>Juniper 5%</p> <p>Big Sagebrush 5%</p> <p>Low Sagebrush 2%</p> <p>Visual observations indicate that juniper is more dominant than sampled vegetation reflects.</p>	<p>Canopy Cover:</p> <p>Grass 9%</p> <p>Forbs 4%</p> <p>Shrubs 24%</p> <p>Trees 1%</p> <p>Bare Ground 38%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Low Sagebrush 24%</p> <p>Squirreltail 3%</p> <p>Bluegrass 3%</p>
8) Big Sagebrush/Bluebunch Wheatgrass-Indian Ricegrass	Nearly level to gently sloping basin terraces with slopes from 2-6%. Elevation is 4500-5500 ft. & precipitation is 8" to 11".	Loamy surface layers with mixed, fine textured subsoils. Usually calcareous & may be alkaline. Soils may have a vesicular surface layer.	Gorzell gravelly loam; Nevador loamy fine sand; Langston sandy loam; Olson fine sandy loam; Pegler fine sandy loam; & Uylach fine sandy loam.	<p>Canopy Cover:</p> <p>Grass 50%</p> <p>Forbs 5%</p> <p>Shrubs 20%</p> <p>Bare Ground 10-20%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Big Sagebrush 20%</p> <p>Bluebunch Wheatgrass 20%</p> <p>Indian Ricegrass 15%</p> <p>Weber Ricegrass 5%</p> <p>Squirreltail 5%</p>	<p>Canopy Cover:</p> <p>Grass 1%</p> <p>Forbs 3%</p> <p>Shrubs 25%</p> <p>Bare Ground 62%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Big Sagebrush 22%</p> <p>Moss 3%</p> <p>Spiny Hopsage 2%</p> <p>Rabbitbrush 1%</p> <p>Squirreltail 1%</p>

APPENDIX C (Continued)

ECOLOGICAL SITE CHARACTERISTICS

ECOLOGICAL SITE	PHYSIOGRAPHIC LOCATION	SOIL CHARACTERISTICS	REPRESENTATIVE SOIL SERIES	CLIMAX VEGETATION	PRESENT VEGETATION
9) Big Sagebrush/ Bluebunch Wheat- grass	Nearly level to gently rolling hills with slopes from 0-30%. Precipitation is 8" to 12".	Surface layers are dark-colored, gravelly, stony, extremely stony loam, fine sandy loam or loam. They are shallow to very deep over bedrock.	Mascamp extremely stony, sandy loam; Powley, gravelly fine sandy loam; Espil gravelly sandy loam; Hart Camp gravelly fine sandy loam; & Schamp stony loam.	Canopy Cover: Grass 55% Forbs 10% Shrubs 10% Bare Ground 10%	Canopy Cover: Grass 3% Forbs 2% Shrubs 24% Bare Ground 50%
				Dominant Species (% Canopy Cover): Bluebunch Wheat- grass 30% Sandberg blue- grass 15% Thurber Needle- grass 10% Big Sagebrush 10%	Dominant Species (% Canopy Cover): Big Sagebrush 21% Squirreltail 1% Rabbitbrush 1% Low Sagebrush 1%
10) Big Sagebrush/ Idaho fescue	North facing slopes between 4400-7000 ft. Slope varies from 25-70% & precipitation is 9" to 15".	Surface layers are medium textured & subsoils are medium to moderately fine textured & are dark colored. Bedrock out- crops & talus slopes are common on this site.	Snag very stony, sandy loam.	Canopy Cover: Grass 100% Forbs 10% Shrubs 10% Bare Ground 10%	This site was not sampled during 1977. Its present condition is estimated to be "fair." Present vege- tation consists primarily of big sagebrush, Idaho fescue & Sandberg bluegrass.
				Dominant Species (% Canopy Cover): Idaho fescue 40% Sandberg blue- grass 15% Western Needle- grass 15% Big Sagebrush 5% Low Sagebrush 5%	

ECOLOGICAL SITE CHARACTERISTICS

ECOLOGICAL SITE	PHYSIOGRAPHIC LOCATION	SOIL CHARACTERISTICS	REPRESENTATIVE SOIL SERIES	CLIMAX VEGETATION	PRESENT VEGETATION
11) Big Sagebrush/ Basin Wildrye	Nearly level fans in the upper portions of dry or intermittent drainage systems. Elevation is between 4200-5600 ft. & annual precipitation is 7" to 11".	Surface layers are silty clay loam or overwashed sandy loam. Subsoils are medium to moderately fine textured & some are sandy. Soils commonly have a vesicular surface layer which decreases permeability & increases runoff.	Disabel silty clay loam & Flooded phases of this series, the Dugway complex & Jesse Camp very fine sandy loam.	<p>Canopy Cover:</p> <p>Grass 60%</p> <p>Forbs 5%</p> <p>Shrubs 15%</p> <p>Bare Ground 15%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Basin Wildrye 10%</p> <p>Thurber Needlegrass 10%</p> <p>Needle and Thread 10%</p> <p>Indian Ricegrass 10%</p> <p>Big Sagebrush 10%</p>	<p>Canopy Cover:</p> <p>Grass 1%</p> <p>Forbs 4%</p> <p>Shrubs 24%</p> <p>Bare Ground 54%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Big Sagebrush 18%</p> <p>Rabbitbrush 5%</p> <p>Moss 4%</p> <p>Greasewood 1%</p> <p>Squirreltail 1%</p>
Visual observations of adjacent sites in "fair" or "good" condition show considerably more Basin Wildrye than this site description indicates.					
12) Big Sagebrush- Juniper/Bluebunch Wheatgrass	South facing slopes at elevations between 5000-6000 ft. Slope varies from 20-50% & precipitation is 10" to 12".	Surface layers are medium textured & subsoils are moderately fine textured. They are very stony throughout. This site is normally associated with rubbleland & rock outcrops.	Mendiboure	<p>Canopy Cover:</p> <p>Grass 35%</p> <p>Forbs 5%</p> <p>Shrubs 8%</p> <p>Trees 12%</p> <p>Bare Ground 10%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Bluebunch Wheatgrass 25%</p> <p>Juniper 12%</p> <p>Big Sagebrush 5%</p> <p>Sandberg bluegrass 5%</p> <p>Squirreltail 2%</p> <p>Low Sagebrush 2%</p>	<p>Canopy Cover:</p> <p>Grass 12%</p> <p>Forbs 15%</p> <p>Shrubs 10%</p> <p>Trees 1%</p> <p>Bare Ground 29%</p> <p>Dominant Species (% Canopy Cover):</p> <p>Big Sagebrush 10%</p> <p>Sandberg bluegrass 7%</p> <p>Moss 7%</p> <p>Carex 4%</p> <p>Phlox 4%</p> <p>Juniper 1%</p>

APPENDIX C (Continued)

ECOLOGICAL SITE CHARACTERISTICS

ECOLOGICAL SITE	PHYSIOGRAPHIC LOCATION	SOIL CHARACTERISTICS	REPRESENTATIVE SOIL SERIES	CLIMAX VEGETATION	PRESENT VEGETATION
13) Bitterbrush/Idaho fescue	Rolling hills with slopes from 2-25%. Elevation varies from 6000-7500 ft. & annual precipita- tion is 11" to 15".	Soils are deep & have medium textured sur- face layers & medium to moderately fine textured subsoils. They are generally stony or gravelly throughout.	Bidwell loam; Hapgood sandy loam; Catnip extremely cobbly loam; Donica very gravelly sandy loam; Newlands stony loam; Home Camp stony loam; Surprise gravelly sandy loam.	Canopy Cover: Grass 65% Forbs 15% Shrubs 25% Bare Ground 10-15% Dominant Species (% Canopy Cover): Idaho fescue 30% Bitterbrush 15% Canby blue- grass 10% Thurber's Needle- grass 5% Bluebunch Wheat- grass 5% Big Sagebrush 5%	Canopy Cover: Grass 12% Forbs 4% Shrubs 27% Bare Ground 33% Dominant Species (% Canopy Cover): Big Sagebrush 15% Low Sagebrush 8% Squirreltail 4% Bitterbrush 3% Thurber's Needle- grass 2%
14) Mountain Mahogany/ Western Needle- grass	Rocky ridges and mountainous foot- slopes. Elevation is above 6500 ft. & annual precipita- tion is 11" to 15".	Surface layers are loamy with loamy to clayey subsoils. Soils are usually shallow & have a high proportion of gravel, stone, or rock throughout.	Foxmount gravelly loam & Newlands bouldery loam.	Canopy Cover: Grass 40% Forbs 10% Shrubs 75% Bare Ground 5% Dominant Species (% Canopy Cover): Curlleaf Mtn. mahogany 40% Big Sagebrush 15% Western Needle- grass 15% Canby blue- grass 5% Cusick blue- grass 5% Western Melic 5%	This site was not sampled during 1977. Its estimated condition is "fair." Present vegetation consists of dense overstory of mahogany with a needlegrass & blue- grass understorey.

APPENDIX C (Continued)

ECOLOGICAL SITE CHARACTERISTICS

ECOLOGICAL SITE	PHYSIOGRAPHIC LOCATION	SOIL CHARACTERISTICS	REPRESENTATIVE SOIL SERIES	CLIMAX VEGETATION	PRESENT VEGETATION
15) Silver Sagebrush/ Mat Muhly	Flat, undrained basins that are periodically flooded for short periods of time. Elevation ranges from 4000-6500 ft. & precipitation is 8" to 12".	Surface layers are moderately fine to fine textured & sub-soils are clayey. Soil churning resulting from high clay content damages root systems of many plants.	Boulder Lake silty clay; Disabel silty clay loam, flooded; Weimer silty clay, drained.	Plant composition is extremely variable depending on the frequency & degree of period flooding. Canopy Cover: Grass 0-25% Forbs 5-25% Shrubs 30-60% Bare Ground 30-50% Dominant Species (% Canopy Cover): Silver Sage-brush 17% Rabbitbrush 9% Poverty Weed 1%	Canopy Cover: Grass 1% Forbs 1% Shrubs 26% Bare Ground 55%
16) Baltic Rush	Nearly level enclosed basin at elevations between 5500-7500 ft. Annual precipitation is 12" to 14".	Similar to the Silver sagebrush/Mat muhly site except that they are flooded for longer periods of time in the spring.	Soils as noted under the Silver sagebrush/Mat muhly site.	Flooding is of sufficient duration to prohibit the growth of most perennial plants other than Baltic rush. Annual forbs vary widely from year to year.	This site was not sampled during 1977. Present vegetation consists primarily of Baltic rush.

APPENDIX C (Continued)

ECOLOGICAL SITE CHARACTERISTICS

ECOLOGICAL SITE	PHYSIOGRAPHIC LOCATION	SOIL CHARACTERISTICS	REPRESENTATIVE SOIL SERIES	CLIMAX VEGETATION	PRESENT VEGETATION
17) Aspen/Slender Wheatgrass	North facing slopes at elevations above 6500 ft. Precipitation is 12" to 15". Additional moisture is received from snowdrifts which accumulate above this site.	Dark-colored surface layers. Surface layers & subsoils are loamy. Subsoils may be moderately fine textured.	Hapgood very gravelly loam.	Canopy Cover: Grass 80% Forbs 20% Shrubs 1% Trees 70% Bare Ground 0% Dominant Species (% Canopy Cover): Aspen 70% Slender Wheatgrass 15% Mtn. brome 10% Bluegrasses 25% Idaho fescue 5% Other needle-grasses 10%	Canopy Cover: Grass 1% Forbs 2% Shrubs 6% Trees Undetermined Bare Ground 8% Dominant Species (% Canopy Cover): Wildrye 9% Mtn. brome 5% Big bluegrass 4% Juniper 2% Serviceberry 2% Rabbitbrush 1%
18) Tufted Hairgrass-Bluegrass	Seeps and springs throughout the study area. Water is usually available throughout the growing season. The edges often dry up during late July or August. This site is similar to the willow/tufted hairgrass site which occurs along streams & drainage bottoms. The difference being that willows are a conspicuous component of the latter.	Soils are wet sandy to clayey loams over 20" deep. They are generally poorly drained.	Welch silty clay loam; Welch very fine sandy loam.	Canopy Cover: Grass 125% Forbs 10% Shrubs 0% Bare Ground 0% Dominant Species (% Canopy Cover): Tufted Hairgrass 45% Nevada bluegrass 25% Baltic rush 20% Sedges 6% Meadow barley 5% Red Top 5%	Canopy Cover: Grass 36% Forbs 6% Shrubs 40% Dominant Species (% Canopy Cover): Sedges 23% Sandberg bluegrass 8% Baltic rush 2% Iris 2% Lambs quarter 2%

APPENDIX C (Continued)

ECOLOGICAL SITE CHARACTERISTICS

ECOLOGICAL SITE	PHYSIOGRAPHIC	SOIL CHARACTERISTICS	REPRESENTATIVE SOIL SERIES	CLIMAX	PRESENT
	LOCATION			VEGETATION	VEGETATION
19) Willow/Tufted Hairgrass-Bluegrass	Along slightly to moderately sloping streams & drainage bottoms throughout the study area. It receives 6" to 20" of precipitation. Additional moisture is supplemented by surface runoff & springs. Water is usually available throughout the growing season.	Wet sandy to clayey loams over 20" deep.	Welch silty clay loam & Welch very fine sandy loam.	With the exception of the willow component this site is similar to the tufted hair-grass-bluegrass site. A separate site description was not developed for this site by Anderson (1978) to reflect the amount of willow present.	<div>Canopy Cover:</div> <div>Grass 48%</div> <div>Forbs 6%</div> <div>Shrubs Undetermined</div> <div>Trees Undetermined</div> <div>Bare Ground 24%</div> <div>Dominant Species (% Canopy Cover):</div> <div>Sedges 16%</div> <div>Red Top 12%</div> <div>Baltic rush 9%</div> <div>Forbs 3%</div> <div>Meadow Barley 2%</div> <div>Buttercup 2%</div> <div>Willow</div>

Miscellaneous
 Acreages within this category include rubbleland, rock outcrop, badland, intermittent lakebeds and playas. Lakebeds, badlands and playas are virtually denuded of vegetation. Rubbleland and rock outcrop are generally interspersed with various ecological sites but are so steep and rocky that they are not used by livestock.

Appendix D

SMALL MAMMALS AND NON-GAME BIRDS ASSOCIATED WITH SPECIFIC HABITAT TYPES

Small mammals and non-game birds are diverse and closely associated with specific habitats. These species are discussed on a habitat-type basis at the association group level. A comparison is made of habitat structural character and species present in each habitat in a grazed and ungrazed condition (TABLE D-1).

SHADSCALE ASSOCIATION

Habitat structure in grazed areas was characterized by a shrub layer (34 centimeters high) and a middle layer (22 centimeters high). A lower layer of herbaceous vegetation has been eliminated by grazing. The average vegetative cover was 17 percent. Litter was present in 30 percent of the area and averaged 1.7 mm deep.

One small-mammal species and seven bird species were found in the grazed site (TABLE D-2). No reptiles, amphibians, or insects were found on the transects.

Habitat structure on the ungrazed site was nearly identical to the grazed site except that a lower stratum of vegetation occurred at a height of 4.5 cm and the litter depth was 3.0 mm. Sixty-nine percent of the area was without litter. This habitat type is so droughty that more than 35 years is required for recovery to site potential.

Five small-mammal species and six bird species were found on the ungrazed sites (TABLE D-2).

The increase in mammal diversity resulted from the increase in grass understory. Chipmunks and pocket mice are closely tied to grass seed sources (Kritzman, 1974). Insects were found on three plots in the ungrazed area. Deer mice depend heavily on water from insects on which they feed. This explains the deer mice presence in the ungrazed shadscale.

Avian diversity was limited on both sides. The ungrazed site had more predatory birds with a larger biomass -- raptors found in the ungrazed site are larger than the shrikes found in the grazed area. A larger mammal prey base supports such raptors.

No reptiles or amphibians were observed in the study area. Literature searches indicate that the following species may occur in shadscale habitat: Spadefoot Toad, Leopard Lizard, Desert Horned Lizard, Side-Blotched Lizard, Western Whiptail, Desert Striped Whipsnake, Western Rattlesnake.

TABLE D-1
GRAZING HISTORY BY HABITAT TYPE

<u>Habitat Type</u>	<u>Last Year Grazed</u>	<u>Years Ungrazed</u>
Shadscale	1942	35
Greasewood	1942	35
Low sage	1970	7
Big sage	1970	7
Aspen	1890	87
Meadow	1960	17
Willow/Meadow	1960	17
White Fir	*	*

* Livestock were in the allotment but did not graze the survey area due to the lack of water.

TABLE D-2

SMALL MAMMALS AND BIRDS FOUND IN THE SHADSCALE ASSOCIATION

	<u>Grazed Area</u>	<u>Ungrazed Area</u>
Small Mammals	Chisel-toothed kangaroo rat	Least chipmunk Great Basin pocket mouse Little pocket mouse Chisel-toothed kangaroo rat Deer mouse
Birds	Rock wren Grey flycatcher Loggerhead shrike Vesper sparrow Sage sparrow Brewer's sparrow Western meadowlark	Marsh hawk Red-tailed hawk Horned lark Brewer's blackbird Sage sparrow Brewer's sparrow

GREASEWOOD ASSOCIATION

Greasewood habitat in grazed condition is characterized by an upper layer 54.5 cm high, a mid-stratum at 21.0 cm, and a lower layer at 6.0 c.m. Vegetative cover averaged 22 percent. Litter depth was 1.6 mm. Seventy-six percent of litter depth measurements found no litter.

Five species of small mammals, seven bird species, three reptiles, and four insects were found on grazed sites.

In an ungrazed condition greasewood habitat contained an upper layer 86.0 cm high, a mid-stratum 47.3 cm high, and a lower layer 10.3 cm high. Vegetative cover was 32 percent. Litter depth was 9.7 mm, with only 44 percent of the measurements showing no litter depth. Great Basin wildrye inclusions are found in ungrazed greasewood habitat. In the grazed area this species is nearly absent due to heavy use by cattle in spring.

Eight species of mammals and six species of birds were found on the ungrazed site (TABLE D-3).

Habitat structure is significantly altered by grazing: Great Basin wildrye has been eliminated, and litter depth is one-sixth that of ungrazed sites. The presence of Great Basin wildrye on the ungrazed site accounts for the pocket mice and harvest mice, as both species are associated with good grass cover (Black, 1968). The presence of white-crowned sparrows is linked to the presence of Great Basin wildrye, and the occurrence of the marsh hawk is related to the presence of chipmunks in the ungrazed areas, as in the ungrazed shadscale association.

LOW SAGEBRUSH ASSOCIATION

Habitat structure of a grazed site of this type is characterized by an upper vegetation layer 27.0-31.0 cm high, a mid-layer 13.0 cm high or absent, and a lower layer 7.0-11.0 cm high. Vegetative cover averaged 26-34 percent. Litter averaged 2.1-3.6 mm deep -- 68 percent of sampled sites had no litter. Four species of mammals and 18 species of birds were found on the grazed area.

The ungrazed site, with an upper layer of grass rather than sagebrush, has an upper layer of 53.0 cm nearly twice as high as on the grazed site. The mid-stratum was 31.0 cm high, equal to the upper stratum of the grazed site. A lower layer of 6.5 cm high was present. Total vegetative cover was about 39 percent and composed of grass. Litter depth averaged 3.1 mm.

Four species of mammals and six species of birds were recorded on the ungrazed area (TABLE D-4).

TABLE D-3

ANIMAL SPECIES FOUND IN THE GREASEWOOD ASSOCIATION

	<u>Grazed Area</u>	<u>Ungrazed Area</u>
Small Mammals	White-tailed antelope squirrel Chisel-toothed kangaroo rat Dark kangaroo mouse Western harvest mouse Deer mouse	Nuttall's cottontail White-tailed antelope squirrel Least chipmunk Little pocket mouse Chisel-toothed kangaroo rat Western harvest mouse Desert wood rat
Birds	Mourning dove Scrub jay Sage thrasher Western meadowlark Versper sparrow Sage sparrow Brewer's sparrow	Marsh hawk Horned lark Western meadowlark Sage sparrow Brewer's sparrow White-crowned sparrow
Reptiles		Side-blotched lizard Western whiptail Desert striped whipsnake
Insects		Ants Cicada Grasshopper Leafhopper

TABLE D-4

ANIMAL SPECIES FOUND IN THE LOW SAGEBRUSH ASSOCIATION

	<u>Grazed Area</u>	<u>Ungrazed Area</u>
Small Mammals	Great Basin pocket mouse Golden manteled ground squirrel Deer mouse	Least chipmunk Great Basin pocket mouse Deer mouse Sagebrush vole
Birds	Mourning dove Sage grouse Common flicker (T) Horned lark Scrub jay (T) Mountain bluebird (T) Loggerhead shrike Mountain chickadee (T) Red-breasted nuthatch (T) Rock wren Sage thrasher Robin Grey flycatcher Western meadowlark Vesper sparrow Brewer's sparrow Sage sparrow Western bluebird	American kestrel Common flicker Horned lark Western meadowlark Vesper sparrow Brewer's sparrow
Reptiles		Western fence lizard Gopher snake
Insects		Ants Beetles

(T) Species inhabiting junipers which have invaded low sagebrush areas.

Grazing appears to have eliminated the upper stratum of the habitat type by reducing the height of perennial grass. The presence of sagebrush voles and pocket mice in the ungrazed area and their absence in grazed areas are in response to their specific need for grass forage. The sagebrush vole and pocket mice require grass cover throughout the year (Quast, 1950). Chipmunks occur on the ungrazed site but not on the grazed site, as in the shadscale and greasewood habitat types.

Grazing has increased bird diversity. Removal of herbaceous vegetation has fostered juniper encroachments. Flickers, jays, bluebirds, chickadees, and nuthatches use these trees. Meadowlarks and vesper sparrow abundance decreases with grazing, while the horned larks are more numerous in grassy areas than in heavily grazed areas, but are less numerous on ungrazed, very grassy sites.

BIG SAGE ASSOCIATION

Habitat structure on grazed areas consists of an upper layer of big sage 61-72 cm high, a middle layer 23-56 cm high (present on only 30 percent of the study plots), and a lower layer of short grasses and forbs 14-24 cm high. Average percent vegetative cover was 35 percent and average litter depth 6 mm.

Six species of small mammals, 13 bird species, and 11 insects were observed. Though unobserved, eight species of reptiles are known to occur in the big sage habitat, based on Fautin (1946) and Stebbins (1966) (TABLE D-5).

On ungrazed areas the upper stratum was 75 cm high and composed of sagebrush, the middle layer was 39-45 cm high composed of big sage, rabbitbrush, and grass, and the lower layer averaged 15 cm high. Average vegetative cover was 43 percent, average litter depth was 7.5 mm, and litter occurred on 90 percent of the sites sampled.

Seven species of small mammals, 20 species of birds, and five insect species were found in the ungrazed areas (TABLE D-6).

Deer mice, black-tailed jackrabbits, and wood rats are characteristic of heavily grazed sites with reduced vegetative cover (Vorhies and Taylor, 1940). Grinnel and Miller (1944) states this habitat is considered optimum for Brewer's sparrow. The gray flycatcher also requires mature stands of sagebrush to nest and forage for insects. Flickers and jays are associated with invading junipers and the rock wren depends on rock outcrops within the habitat type. The increased number of insects is a response to increased litter depth and distribution compared to the shadscale, greasewood, and low sage sites.

Ungrazed sites provide habitat for long-tailed and montane meadow mice which were absent from grazed sites. Least chipmunks were twice as abundant on ungrazed sites as on grazed sites. Bird diversity doubled on the ungrazed site. These observations correspond to Monsoon's (1941)

TABLE D-5

Reptiles Known to Occur in Big Sage Habitat Types

Leopard Lizard
Brown-shouldered Uta
Sagebrush Lizard
Whiptail Lizard
Striped Whipsnake
Western Yellow-bellied Racer
Great Basin Gopher Snake
Great Basin Rattlesnake

Sources: Fautin (1946) and Stebbins (1966).

TABLE D-6

ANIMAL SPECIES FOUND IN THE BIG SAGE HABITAT TYPES

	<u>Grazed Area</u>	<u>Ungrazed Area</u>
Small Mammals	Black-tailed jackrabbit Least chipmunk Dark kangaroo mouse Canyon mouse Desert wood rat	Least chipmunk Great Basin pocket mouse Deer mouse Long-tailed meadow mouse Montane meadow mouse Sagebrush vole Long-tailed weasel
Birds	American kestrel Chukar Loggerhead Shrike Rock Wren Western meadowlark Grey flycatcher Brewer's sparrow Sage sparrow Common flicker Scrub jay Mountain chickadee White-crowned sparrow	Sharp-shinned hawk Mourning dove Common Flicker Scrub jay Robin Western meadowlark Green-tailed towhee Vesper sparrow Brewer's sparrow White-crowned sparrow Turkey vulture Red-tail hawk California quail Sage thrasher Brewer's blackbird Brown-headed cowbird Bullock's Oriole Chipping Sparrow Lark sparrow Dark-eyed junco

findings. He compared grazed and ungrazed areas in a scrub vegetation type in Arizona and found almost twice the number of birds on the ungrazed site, which he attributed to increased food and vegetative cover.

MOUNTAIN MAHOGANY ASSOCIATION

A grazed site of this type was analyzed for vegetation structure and wildlife use. No mountain mahogany site free of grazing impacts could be found for use as a control for the grazed area.

The canopy in this habitat consists of mountain mahogany and has a mean height of 2.55 meters. A mid-stratum occurs at 55.6 cm and a lower stratum at 7.8 cm. Vegetation canopy coverage was 45 percent and an understory canopy of 42 percent exists. Litter cover was found on 63 percent of the area at an average depth of 11.4 mm.

Three species of small mammals were trapped in this habitat type, and five species of large mammals were frequently encountered. Deer pellets were found on 65 percent of the study plots. Nineteen species of birds were counted and nine reptile species are thought to inhabit mahogany areas (TABLE D-7).

The diversity of the mahogany association supports a variety of species. Openings in the brush provide grasses and shrubs for use by towhees, robins, and quail. Birds nest in the mahogany or use it for cover on the windswept ridges where this habitat type occurs. Kestrels and owls perch on the mahogany branches and search for prey in the openings. Inclusions of sagebrush and rock outcrops are used by raptors and reptiles for feeding and sunning.

SILVER SAGEBRUSH ASSOCIATION

This association constitutes less than 1 percent of the area and was inventoried for birds only.

Widespread rabbitbrush in this type provides habitat for rabbits, quail, sage grouse, and songbirds. Along the banks of streams feeding silver sage areas are nesting sites for rough-wing and violet-green swallows and belted kingfishers. Willets and spotted sandpipers nest on gravelly areas near the streambed. Mud from the streambed is used for nest building by robins, cliff swallows, and barn swallows.

Livestock watering in this habitat type causes bank erosion, soil compaction, and vegetation trampling and removal.

BALTIC RUSH ASSOCIATION

Baltic rush habitat is characterized by periodic flooding. Sampling was conducted after two years of drought.

TABLE D-7

Animals Species Found In Mountain Mahogany Habitat Types

Small Mammals (Trapped)

Yellow Pine Chipmunk
Great Basin Pocket Mouse
Deer Mouse

Reptiles (Expected to Occur)

Short-horned Lizard
Sagebrush Lizard
Side-blotched Lizard
Western Skink
Racer
Spotted Night Snake
Desert Striped Whipsnake
Gopher Snake
Great Basin Rattlesnake

Birds

Red-tailed Hawk
American Kestrel
California Quail
Mourning Dove
Poor-will
Common Flicker
Yellow-bellied Sapsucker
Scrub Jay
Mountain Chickadee
Red-breasted Nuthatch
House Wren
Robin
Orange-crowned Warbler
Brewer's Blackbird
Green-tailed Towhee
Rufous-sided Towhee
Vesper Sparrow
Dark-eyed Junco
Brewer's Sparrow

The vegetation structure consisted of a single layer with a mean height of 8.75 cm. Vegetative cover was 11 percent, litter 8 percent, and bare ground 58 percent. Litter depth was 1.6 mm. The mammals, birds, and amphibians listed in TABLE D-8 were observed.

Normally, interspersed flooded and dry areas provide islands of Great Basin wildrye which provides perches for blackbirds and other birds and seed for granivorous birds. When Baltic rush areas dry up completely they are used extensively by antelope.

BLUEGRASS/SEDGE ASSOCIATION (MEADOWS)

Two vegetative layers were found in grazed meadows. The lower layer, predominately sedge, averages 5.1 cm tall with a big sage or rabbitbrush overstory averaging 32.5 cm in height. Mean vegetative cover was 35.8 percent. Litter was 1.1 mm deep; 65 percent of the area sampled had no litter.

Nine species of mammals, eight species of birds, and five insects were found during sampling (TABLE D-9).

Ungrazed meadows also had a two-story vegetation canopy, an upper canopy 49.8 cm high comprised of grasses, sedges, and rushes, and a grass understory 33 cm in height. Mean vegetative cover was 60 percent. Litter covered 82.5 percent of the area and averaged 25 mm deep.

Three species of small mammals and nine bird species were sampled. No insects were observed due to cold temperatures during sampling (TABLE D-9).

Though not observed on any meadows sampled, literature indicates the following amphibians (Stebbins, 1956) and bats (Hall, 1946; Hall and Kelson, 1959) could be expected to inhabit and forage in meadows:

Amphibians: Western Toad; Pacific Tree Frog; and Leopard Frog.

Bats: Little Brown Bat; Yuma Myotis; Small-footed Myotis; Silvery Haired Bat; Hoary Bat; and Mexican Free-tailed Bat.

Meadows, because of fertile soils and abundant water, are one of the desert's most productive habitats. In the grazed conditions found in Cowhead/Massacre, meadows have suffered significant decreases in productivity. Reduction in soil moisture occurs from concentrated livestock and wild horse use, which compacts soil, decreasing its ability to absorb water and reducing its capacity for water storage. Excessive removal of vegetation exposes the soil surface to dehydration by wind and sun. Evaporation rates increase. Loss of vegetation results in less organic litter, which also contributes to increased evaporation. Recreational camping on meadows has an effect similar to livestock grazing on meadows.

TABLE D-8

Animal Species Found in the Baltic Rush Association

Mammals

Deer Mouse

Amphibians

Pacific Treefrog

Bullfrog

Leopard Frog

Birds

Scrub Jay

Clark's Nutcracker

Rock Wren

Mountain Bluebird

Western Meadowlark

Brewer's Blackbird

TABLE D-9

Birds and Small Mammals Found in the Bluegrass/Sedge Association

	<u>Grazed Areas</u>	<u>Ungrazed Areas</u>
Mammals	Pygmy Rabbit Townsend Ground Squirrel Least Chipmunk Sagebrush Vole Northern Grasshopper Mouse Deer Mouse Great Basin Pocket Mouse Ord Kangaroo Rat Dark Kangaroo Mouse	Vagrant Shrew Montane Meadow Mouse Deer Mouse
Birds	Killdeer Grey Flycatcher Rough-winged Swallow Sage Thrasher Western Meadowlark Brewer's Blackbird Sage Sparrow Brewer's Sparrow	Sage Grouse Tree Swallow Western Meadowlark Red-winged Blackbird Brewer's Blackbird Savannah Sparrow Vesper Sparrow Sage Sparrow Brewer's Sparrow

Mammal species observed in the grazed meadow are very similar to those found in the big sage association. Meadows are so disturbed and so severely invaded by sagebrush that small mammals characteristic of meadows, such as the montane meadow mouse, do not occur. Such species require dense cover normally provided by meadows. Grazed meadows have a litter depth of 1.1 mm compared to 25 mm on the ungrazed meadow. Litter provides such small mammals with cover for escape, successful reproduction, and resting. Litter hides entrances to burrows and provides safe runways for meadow mice.

Bird use on the grazed meadow was associated with sagebrush. No red-wing blackbirds were present on the grazed meadow, but 42 occurred on the ungrazed meadow. No sage grouse were observed on the grazed meadows; 97 were counted on the ungrazed meadow. Conversely, grey flycatchers were present on grazed sites but not on the ungrazed site. Grey flycatchers require sagebrush habitat.

Meadow habitat is being transformed into sagebrush habitat.

WILLOW/RIPARIAN ASSOCIATION

The potential exists for restoring this habitat under livestock exclusions and revised grazing management. It was examined in an ungrazed condition to provide an analysis of wildlife use of this type.

In an ungrazed area three distinct vegetation layers were found. The canopy averaged 395 cm in height, the mid-stratum was 97 cm tall, and the understory was 32 cm high. Mean vegetative cover was 83 percent. Litter covered 75 percent of the area and averaged 21 mm deep.

Six species of mammals were collected, six additional species were observed, and 24 species of birds were seen (TABLE D-10). Though none were observed, amphibians that inhabit meadows may also be expected here.

Riparian habitats support the highest populations of noncolonial nesting birds in North America (Johnson, 1970).

The willow habitat is potentially one of the most productive types in the Cowhead/Massacre area although it is currently severely degraded.

The woody canopy and mid-stratum layers provide cover and important food sources. Willow branches are browsed by deer. Rosebuds are important sources of food for mammals and birds. Insects flying about willows or on the foliage are eaten by swallows, flycatchers, warblers, and other birds. Branches function as lookouts and foraging posts for raptors and insectivorous birds. The inner bark is eaten by porcupines and insects within the bark are eaten by woodpeckers.

The canopy cover provides nest sites for house wrens, tree swallows, and other cavity nesters. Jays, dove, and bushtits nest in the branches and foliage.

TABLE D-10

Animal Species Found In Ungrazed Willow Riparian Association

Small Mammals (Collected)

Vagrant Shrew
 Montane Meadow Mouse
 Western Harvest Mouse
 Great Basin Pocket Mouse
 Deer Mouse
 Long-tailed Meadow Mouse

Mammals (Observed)

Mule Deer
 Cottontail
 Pygmy Rabbits
 Least Chipmunk
 Bobcat
 Coyote

Birds

Marsh Hawk
 Sage Grouse
 Long-eared Owl
 Common Flicker
 Hairy Woodpecker
 Western Wood Pewee
 Scrub Jay
 Red-breasted Nuthatch
 House Wren
 Robin
 Hermit Thrush
 Warbling Vireo
 Orange-crowned Warbler
 Nashville Warbler
 Yellow Warbler
 Wilson's Warbler
 Unidentified Warbler
 Western Meadowlark
 Red-winged Blackbird
 Green-tailed Towhee
 Savannah Sparrow
 Vesper Sparrow
 Brewer's Sparrow
 White-crowned Sparrow

Riparian trees are extremely important for such species as owls, woodpeckers, and warblers. The scarcity of trees in the desert make this habitat crucial for many species. Cottonwoods and aspen often grow around willows and they provide nest sites for species which require large nesting cavities or sites higher than willows reach. Western kingbirds, western bluebirds, kestrels, great-horned owls, and red-tailed hawks would nest in these trees.

The mid-stratum and understory are used by quail and meadowlarks. Western harvest mice build their nests in tall grasses and moles, shrews, rabbits, and meadow mice depend on rank vegetation for cover and moisture.

Such habitat has been severely disturbed or eliminated on most sites in Cowhead/Massacre.

ASPEN ASSOCIATION

In the grazed aspen stand the upper layer was 802 cm high, the mid-stratum 400 cm high, but frequently absent, and the lower layer was 32 cm high.

Overhead cover was 79 percent and understory cover was 5 percent. Litter depth averaged 18 mm.

Six species of small mammals, 22 species of birds, two species of reptiles, and seven insect species were counted (TABLE D-11).

In the ungrazed stand the upper layer was 903 cm high and frequently broken, allowing light to penetrate. The mid-stratum was present more often in the ungrazed site than in the grazed site and reached a height of 380 cm. The understory was 118 cm high. Overhead cover was 45 percent and understory cover 78 percent. The difference between 78 and 5 percent understory cover is a most significant structural change.

Six species of small mammals and 23 species of birds were counted (TABLE D-11).

Aspen habitat has been reduced in Cowhead/Massacre. Individual groves have decreased in size and every one has been invaded by the surrounding habitat type. Grazing is reducing survival of sprouts and has generally eliminated the understory. This change is responsible for the major difference in wildlife species composition between sites.

All the mammal species listed in the ungrazed site (TABLE D-11), except the deer mouse, are invader species from nearby habitats. The deer mouse is found in all habitat types. Shrews, long-tailed meadow mice, and the jumping mice depend upon the luxurious understory found in ungrazed aspens.

TABLE D-11

Animal Species Found in the Aspen Association

	<u>Grazed Area</u>	<u>Ungrazed Area</u>
Small Mammals	Nuttall's Cottontail Golden-manteled Ground Squirrel Least Chipmunk Great Basin Pocket Mouse Heerman's Kangaroo Rat Deer Mouse	Vagrant Shrew Dusky Shrew Yellow Pine Chipmunk Deer Mouse Long-tailed Meadow Mouse Jumping Mouse
Birds	Blue Grouse Mourning Dove Great Horned Owl Common Flicker Downy Woodpecker <u>Empidonax</u> sp. Steller's Jay Scrub Jay Mountain Chickadee House Wren Robin Mountain Bluebird Warbling Vireo Yellow Warbler Brewer's Blackbird Brown-headed Cowbird Hooded Oriole Northern Oriole Black-headed Grosbeak Green-tailed Towhee Rufous-sided Towhee Dark-eyed Junco	Calliope Hummingbird Rufous Hummingbird Common Flicker Yellow-bellied Sapsucker Hairy Woodpecker <u>Empidonax</u> sp. Western Wood Pewee Tree Swallow Mountain Chickadee House Wren Robin Hermit Thrush Mountain Bluebird Warbling Vireo Yellow-rumped Warbler Macgillivray's Warbler Wilson's Warbler Black-headed Grosbeak Cassin's Finch Pine Grosbeak Dark-eyed Junco White-crowned Sparrow Fox Sparrow

Amphibians and Reptiles

<u>Species Recorded</u>	<u>Species Expected (Unobserved)</u>
Racer	Pacific Treefrog (if springs present)
Western Fence Lizard	Leopard Frog (if springs present)
	Spotted Frog (if springs present)
	Western Garter Snake

Birds inhabiting the grazed and ungrazed aspen stands show clearly the effects of grazing on species occurrence.

In the grazed stands doves utilized the open woodland floor for feeding and nested in trees. Flickers, which prefer interrupted or marginal forest or woodland (Grinnel and Miller, 1944), were numerous. Downy woodpeckers were numerous as were pewees, due to their preference for open mid-strata. Scrub jays and robins were numerous because open understory provides good foraging habitat and the trees provide nest sites. The green-tailed towhee and rufous-sided towhee have invaded from nearby habitat types. Typically, green-tailed towhees avoid forests and only tolerate scattered trees within brushland. (Grinnel and Miller, 1944). The presence of these species indicates that aspen stands are in a badly degraded state.

On the ungrazed aspen area hummingbirds were common and were found feeding on numerous wildflowers. Mountain chickadees were more numerous and nesting was increased due to the evenness of the stand which produced decaying nest trees. Robins were less abundant on the ungrazed site due to their preference for open foraging areas. Hermit thrushes are indicators of heavy undergrowth areas and were found on the ungrazed site. Warblers prefer denser vegetation and were abundant in the ungrazed site. The reduction in the number of dark-eyed juncos and the absence of fox sparrows at the grazed site is due to scant protective cover. Like the hermit thrush, they are both ground nesters. Dambaren and Good (1940) noted that in grazed woods no ground-nesting species were found. Grazing severely affects the success of ground-nesting birds through elimination of protective cover.

WHITE FIR ASSOCIATION

Two white fir areas were examined, one in subclimax condition with some cattle grazing, the other near climax with little or no grazing.

The subclimax stand had an upper layer of white fir 17.3 m high, a middle layer of small fir (*Prunus*) and aspen 4.6 m high, and an understory 0.5 m high. Litter depth was 50 mm.

The climax stand had an upper layer averaging 29 m high, a middle layer 6.1 m high, and a lower layer 0.15 m high that was absent in 90 percent of the area. Vegetative cover was 5 percent at ground level for the near-climax site and 66 percent on the subclimax site.

Mammals and birds found in the subclimax and climax white fir sites are listed in TABLE D-12. Reptiles and amphibians expected to occur in the white fir sites are shown in TABLE D-13.

TABLE D-12

MAMMALS FOUND IN THE WHITE FIR SITES

<u>Sub-Climax Stand</u>	<u>Climax Stand</u>
Golden-mantled Ground Squirrel	Golden-mantled Ground Squirrel
Yellow Pine Chipmunk	Yellow Pine Chipmunk
Least Chipmunk	Northern Flying Squirrel
Deer Mouse	Deer Mouse
Bushy-tailed Wood Rat	Dusky-footed Wood Rat
Great Basin Pocket Mouse	

BIRDS FOUND IN BOTH WHITE FIR SITES

Sharp-shinned Hawk	Mountain Chickadee
Red-tailed Hawk	Red-breasted Nuthatch
Golden Eagle	House Wren
American Kestrel	American Robin
Mourning Dove	Townsend's Solitaire
Common Nighthawk	Warbling Vireo
Common Flicker	Orange-crowned Warbler
Yellow-bellied Sapsucker	Yellow Warbler
Hairy Woodpecker	Yellow-rumped Warbler
Downy Woodpecker	Wilson's Warbler
Western Wood Pewee	Lazuli Bunting
Tree Swallow	Cassin's Finch
Steller's Jay	Pine Siskin
Scrub Jay	Green-tailed Towhee
Black-billed Magpie	Fox Sparrow
Clark's Nutcracker	Dark-eyed Junco

TABLE D-13

REPTILES AND AMPHIBIANS EXPECTED TO OCCUR IN THE WHITE FIR SITES

Pacific Treefrog (Hyla regilla)

Western Toad (Bufo boreas)

Western Fence Lizard (Sceloporus occidentalis)

Western Skink (Eumeces skiltonianus)

Common Garter Snake (T. elegans)

Rubber Boa (Charina bottae)

Source: Stebbins, 1954, 1966.

Appendix E

DETERMINATION OF RELATIVE WILDLIFE VALUES

In order to evaluate overall wildlife values on individual management areas, the following categories were used: deer winter range; deer summer range; antelope winter range; antelope summer range; potential bighorn habitat; sage grouse critical areas (strutting grounds and brood areas); chukar habitat; raptors (nesting pairs); nongame habitat; aquatic habitat; and waterfowl habitat.

For each category, the percentage of the total resource in the planning unit was determined for each management area. For example, of the 99 known pairs of raptors nesting in Cowhead-Massacre, 13 are in Management Area 2E ($13/99 = 0.131$). The total wildlife value for each management area was obtained by simply adding the values obtained in each category.

TABLE 2-13 summarizes the results of this evaluation. It should be pointed out that a value of 0.131 does not mean that 13.1 percent of the area is raptor habitat, but rather that 13.1 percent of all raptors in Cowhead-Massacre are in that area.

The ranking of management areas using this method of evaluation is shown in TABLE E-1. Sub-Unit 1 (High Rock Canyon) is shown to have exceptionally high wildlife values. Management Areas 2E, 3A, and 4B have high wildlife values, although not as great as High Rock Canyon. Values are moderate in Management Areas 4A and 4C. The remainder of the study area (Management Areas 2A, 2B, 2C, 2D, and 3B) have relatively low overall wildlife values. However, the low values in Areas 2A, 2B, and 2D are partially due to their small acreages. Management Areas 2A and 2B contain fairly dense concentrations of deer and Area 2D contains a valuable waterfowl area.

In general, wildlife values can be summarized as shown in TABLE E-2.

No attempt was made to place a value judgment on the relative importance of each category. For the purpose of this evaluation each component is considered to be equal to all the others (i.e., waterfowl and nongame are just as important as raptors and antelope winter range).

PROBLEMS WITH METHOD

The calculation method does not consider acreage of management areas. Absolute values may be fairly low due to small size of areas such as 2D, while concentration of values per acre may be high.

This method assumes that the importance of antelope winter range equals that of deer summer range which equals that of raptor nesting pairs which equals that of waterfowl habitat, etc. It thus places value judgment on values.

Considering winter range and summer range separately for deer and antelope places twice as much value on these species.

This method assumes that all wildlife values are known and have been identified.

It does not consider how particular values in one management area interrelate with, or may even depend upon, those same values in an adjacent management area.

TABLE E-1

IMPORTANCE OF MANAGEMENT AREAS RANKED BY
TOTAL WILDLIFE VALUES

Rank	Management Area	Number of Specific Habitats with Values ^{1/}			Raw Score
		Low ^{2/}	Moderate	High	
1	1	0	2	8	28
2	3A	1	4	6	27
3	4B	2	4	5	25
4	2E	1	1	7	24
5	4C	2	3	4	20
6	4A	4	2	3	17
7	2C	5	4	1	16
8	2B ^{3/}	6	3	0	12
9	2A ^{3/}	6	2	0	10
10	3B	4	2	0	8
11	2D	5	0	0	5

1/ Low = 4.57 percent of total habitat in study area occurs in management area.

Moderate = 4.5-10 percent of total habitat in study area occurs in management area.

High = 10.0 percent of total of habitat in study area occurs in management area.

2/ Low score computed in same manner as for economics section.

3/ Considered to have higher values due to deer concentrations in small management area.

TABLE E-2

Summary of Wildlife Values

Extremely High	Sub-Unit 1
High	Management Areas 2E, 3A, 4B
Moderate	Management Areas 4A, 4C
Low	Management Areas 2A, 2B, 2C, 2D, 3B

Appendix F

CULTURAL RESOURCE SURVEYS: OBJECTIVES, METHODS, RESULTS

Archaeological research in Cowhead/Massacre prior to the 1977 season had focused largely on the problems of sequence and chronology. Sequences had been established for Surprise Valley (O'Connell, 1971) and for the High Rock vicinity (Layton, 1970; 1972) and preliminary sketches of patterns of prehistoric cultural ecology had been advanced (especially O'Connell, 1975; O'Connell and Hayward, 1972). Little research, however, had confronted the problem of site locations even in a limited sphere (save McGonagle, 1974), and regional expectations of site type, frequency of occurrence, and location were based largely on surveys performed outside of the study area (U.S. Dept. Interior, 1978).

Because existing information was inadequate to characterize even roughly the geographic structure of the archaeological record, BLM conducted surveys during the 1977 field season to provide data on: (1) the range of site types present; (2) their distribution in terms of environmental factors; and (3) their condition. To maximize the information return and to allow interpretive flexibility, various approaches were employed:

- (1) A stratified, random sample of 1.83 percent of the study area was surveyed intensively in square-mile sampling units. Stratification was based on the distribution of ecological sites nested within the larger association groups on the premises that hunters/gatherers organize their activities across the landscape largely in response to the distribution of plants and animals, and that present biotic communities, having evolved under the intensive grazing regime, obscure many of the intrinsic differences between places that were important in prehistory (Corson, 1977). Survey intensity was defined by the establishment of 100-meter transects as the minimum level of scrutiny, with deviations allowing for the examination of erosional features, topographic anomalies, and ecotones. In practice, scrutiny was often tightened to approximately 50 meters to allow adequate coverage of complex topographies (see MAP 2-6 for sample unit locations, and TABLE F-1).
- (2) Judgmental surveys were undertaken concurrently to record sites of high significance in settings which prior research indicated would promise the most intensive, long-term occupation and the most concentrated information content. A sample of springs (85) was surveyed in all ecological settings to provide better information on the frequency and variability of water-based occupation sites. Nine thousand eight hundred forty-eight (9,848) acres of canyons and gorges were surveyed, especially to locate as large a number as possible of caves and rock shelters, as well as canyon-bottom open occupation sites and canyon-rim activity areas. Selected lake margins, especially dune complexes, were also surveyed (see MAP 2-6 for survey locations).

- (3) The results of independent, BLM project-related inventories (7,120 acres) were incorporated in the analysis. Such surveys, while dictated by the exigencies of compliance with historic preservation legislation rather than by problem-oriented selection, nonetheless yield data important to an understanding of the prehistory of the study area (see MAP 2-6 for project survey locations).

All surveys were conducted by pedestrian reconnaissance. Survey parties consisted of from one to three persons trained in site recognition. In the survey of springs, all lands adjacent to the springhead or the associated meadows (if any) were scrutinized out to the most prominent topographic boundary (especially uphill or downhill breaks in slope). Canyons were surveyed along the drainage flanks, with scrutiny of the walls for caves, rock shelters, and petroglyphs; at least one rim of each canyon was generally surveyed as well. Lake margins were surveyed from the seasonal high-water line to a boundary several hundred yards back from the shore, or to the nearest major topographic boundary.

Site-type definitions are presented below. Several general considerations of the environmental attributes which appear to have played a role in conditioning site distributions are discussed in Chapter 2. Raw score distributions by ecological site and association group as observed by the random sample are presented in TABLE F-2.

The various surveys resulted in the recognition and recording of 557 archaeological sites, 287 of which lay within the random sample. Site densities within individual sample plots range from 0 to 34 per square mile, with an average density area-wide of 13.8 sites per square mile. Based on a survey of 4.57 percent of the public lands in the planning unit, we predict on the order of 16,000 sites to lie on the unsurveyed remainder.

SITE TYPES

Features of internal constituency segregate the recorded archaeological sites into 11 distinct classes, inferred to represent functional categories of prehistoric places. Details of the distribution of these categories are elaborated in Chapter 2.

Villages (2 recorded)

These sites, constituting central places in the seasonal round, were reoccupied often enough that vertical deposits have accumulated. Principal characteristics include great diversity in artifact types (including the full prehistoric tool assemblage), often dense surface scatters, subsurface components long use displayed in time-sensitive artifacts, and lowland locations (below 5,500 feet) near reliable water sources.

Stone Alignments (2 reported)

Long stone alignments have been located during the course of independent surveys (McGonagle, 1974). They probably represent "drive fences" of the sort employed historically to direct game animals toward ambushes or jumps.

Milling Stations (3 recorded)

These minimal sites consist of isolated milling stones on grass-rich flats and slopes and in lake-margin dune complexes. Very sparse lithic scatters may occur in association.

Lithic Scatters (261 recorded)

The largest category no doubt subsumes several very distinct activity areas the function of which is not apparent without more detailed analysis. These sites consist of scatters of chippage of varying size and density with few definable artifact types. Many could be included in such general classifications as "chipping stations" or "lithic workshops."

TABLE F-1

ARCHAEOLOGICAL SURVEY STATA APPORTIONMENT
(Random Sample Only)

<u>Acreage by Association</u>	<u>Acreage Surveyed</u>	<u>% Surveyed</u>
<u>Shadscale</u>		
20,086 acres	1,280	6.4
<u>Greasewood</u>		
51,018 acres	1,280	2.5
<u>Low Sage</u>		
361,226 acres	4,160	1.2
<u>Big Sage and Bitterbrush</u>		
110,943 acres	7,360	2.0

Sample = 14,080 acres = 1.8% of public lands in study area.

TABLE F- 2

ARCHAEOLOGICAL SURVEY: SITE DISTRIBUTIONS BY ECOLOGICAL SITE
AND ASSOCIATION GROUPS
(Random Sample Only)

<u>Association/Ec. Site No.</u>	<u>Units Surveyed</u>	<u>Sites Recorded</u>	<u>Density</u>
<u>Shadscale</u>			
1	2	3	1.5
<u>Greasewood</u>			
2	2	5	2.5
<u>Low Sage</u>			
4	2.5	33	13.2
5	4	53	13.2
Total/Association:	6.5	86	13.2
<u>Big Sage and Bitterbrush</u>			
8	3	32	10.7
9	5.5	100	18.2
11	1	8	8
13	2	53	26.5
Total/Association:	11.5	193	16.8

Appendix G

OPERATOR DEPENDENCY ON PUBLIC LANDS IN THE COWHEAD/MASSACRE PLANNING UNIT

1. Overall operator dependency on each management area was calculated by dividing the BLM AUMs provided on the area by the rancher's total estimated forage and feed supply from all sources.
2. The following formula was employed to estimate the percentage of the rancher's total herd on each area during the permitted season of use:

$$\frac{\text{BLM AUMs}}{\text{BLM Season of Use (months)}} \div \frac{\text{Total AUs}}{\text{(Herd Size)}}$$

3. The following judgments were used to determine the operator's overall and seasonal dependency on each management area:

Overall

- Low - If BLM AUMs comprise 0-15% of the operator's total annual forage and feed supply.
- Moderate - If BLM supplied 16-25% of the total.
- High - If BLM supplied 26% or more of the total.

Seasonal

- Low - If the rancher had 0-30% of his total herd on the management area during his season of use.
- Moderate - If 31-50% of his herd was on the area.
- High - If 51% or more of his herd was on the area.

4. Determination of the magnitude of outside income was as follows:
- Low - If the operator ran his ranch on a full-time basis and derived most of his income from this source.
- Moderate - If the rancher were employed in a full-time non-ranch job or if he were semi-retired.
- High - If the ranch were owned by outside investors or corporations.

5. The final degree of dependency was determined from the higher value of the overall and seasonal dependencies. These were moderate with the known level of outside income. If outside income was moderate or high, this final determination of dependency was reduced one step (e.g., from high to moderate).
6. The two Carrey operations were aggregated in the Operator Dependency Analysis. However, the low final dependency calculated for the ranches applies to the separate operations as well.

Appendix H

ECOLOGICAL SITES FOR ESTIMATING EROSION

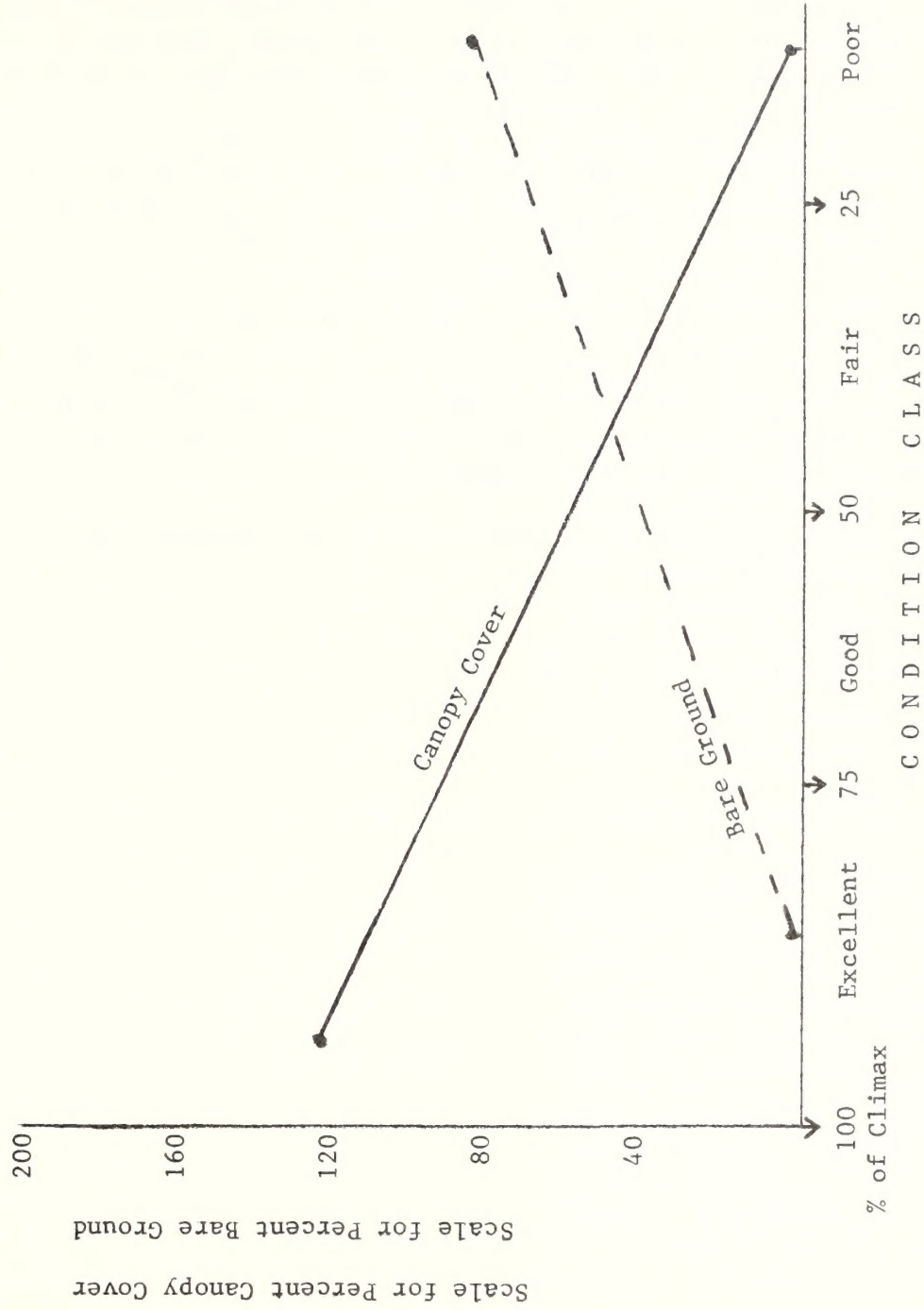
RELATED TO SOILS AND RANGE CONDITION IN CHAPTER 3

Based upon field experience and field observations, the various range condition classes (poor, fair, good, and excellent) were projected for each ecological site at the proposed development 20 years hence. (See Chapter 3, section on vegetation.)

By plotting the climax values for canopy cover and bare ground together with the same values of canopy cover and bare ground for the existing situation it is possible to estimate projected canopy cover and bare ground 20 years hence (see FIGURE H-1). By identifying the condition class or trend and estimating canopy cover and bare ground for 20 years hence, it is possible to estimate erosion losses.

FIGURE H-1

EXAMPLE PLOT FOR DETERMINING CANOPY COVER AND
BARE GROUND FROM CONDITION CLASS



Ecological Site No. 2

Projected Condition Class from
Field Data 20 Years Hence is "fair."

Canopy Cover = 44 Percent

Bare Ground = 56 Percent

Appendix I

IMPACT ON SOIL/WATER RELATIONS

The initial weighted mean area of bare soil was calculated for each management area. This was done by using the percent of bare soil for each constituent ecological site adjusted to its acreage present in the management area. The percent of bare soil by management area may be considered a very general indication of how susceptible that management area is to erosion.

Initial suspended load was calculated by using the initial annual calculated soil loss in tons per acre. The weight of soil loss was assumed to be distributed more or less uniformly throughout the year in water runoff from rain and snow melt.

The annual rainfalls at Fort Bidwell and Cedarville, California and Sheldon, Nevada, were utilized to calculate a 30-year normal annual rainfall (1941-1970). A mean value was used. It was assumed that 80 percent of this rainfall was lost by evapotranspiration, 10 percent by runoff, and 10 percent by deep seepage to ground water. These assumptions made it possible to quantify the soil carried off as suspension.

Similar assumptions were made with regard to sediment generated as a result of the proposed action.

Appendix J

ANTICIPATED RESPONSE OF ECOLOGICAL SITES UNDER THE PROPOSED ACTION

SITE NUMBER ONE, SHADSCALE/INDIAN RICEGRASS (20,000 ac.)

The extremely dry soil conditions and very sparse vegetation would limit the rate of improvement for this site. Expected response would be minimal. Despite an anticipated upward trend under all management proposals, range condition class would be estimated to still be "poor" in 20 years. A comparable site located 120 miles from the study area showed no noticeable improvement in range condition after 35 years of rest (Cowhead/Massacre URA, 1977). Fall and winter grazing in Management Area 2B would adversely affect shadscale vigor and reproduction near livestock concentration areas. Squirreltail would be expected to increase slightly.

SITE NUMBER 2, GREASEWOOD/BASIN WILDRIE (41,000 ac.)

Soils of these sites are typically physiologically dry, have crusty soil surface layers, and are sparsely vegetated. High salt concentrations would limit the response of this site. Under no-grazing conditions little vegetative response would be anticipated. The vigor of herbaceous species would improve but plant density would remain unchanged. Response under other grazing management treatments would be positive, particularly during prescribed and fall grazing. These improvements would be attributed to the beneficial impacts of livestock seed trampling during the fall. The condition of this site in 20 years would be expected to be "poor" under no grazing and "fair" under all other grazing management systems. Basin wildrie and squirreltail would show the most noticeable response.

SITE NUMBER 3, GREASEWOOD-RABBITBRUSH/BASIN WILDRIE (10,000 ac.)

Very little response would be anticipated for this site. An upward trend would be is anticipated for all management proposals but the range condition class would still be poor in 20 years. Dry soil conditions and lack of herbaceous species are the most important limiting factors. Basin wildrie and squirreltail would be expected to increase slightly.

SITE NUMBER 4, LOW SAGEBRUSH/SANDBERG BLUEGRASS (184,000 ac.)

This site would be expected to demonstrate noticeable improvement in range condition. Although soils are relatively dry, herbaceous species comprise approximately 15 percent cover and should increase noticeably. Sandberg bluegrass, squirreltail, and numerous forbs would be anticipated to show the most response. This site would improve from "fair" to "good" condition under all management proposals.

SITE NUMBER 5, LOW SAGEBRUSH/BLUEBUNCH WHEATGRASS (138,000 ac.)

This site would be expected to show considerable improvement in range condition under all management proposals. Soils are relatively moist for low sagebrush associations and remnants of most perennial grasses and forbs remain. Sandberg bluegrass, squirreltail, and Thurber needlegrass would be expected to show the most immediate response but bluebunch wheatgrass would be expected to show the greatest long-term increase in abundance. Range condition would improve from "fair" to "good."

SITE NUMBER 6, LOW SAGEBRUSH/IDAHO FESCUE (12,000 ac.)

This site would improve from "fair" to "good" condition under all management proposals. Sandberg bluegrass and Idaho fescue would be expected to demonstrate the greatest improvement on this site because these species are located on windswept ridges, a dominant factor in limiting livestock grazing and protecting grasses and forbs.

SITE NUMBER 7, JUNIPER-LOW SAGEBRUSH/BLUEBUNCH WHEATGRASS (45,000 ac.)

Noticeable improvement from "poor" to "fair" condition would be expected in range condition for this site under all management proposals. Soils are relatively moist; grasses and forbs comprise approximately 10 percent cover. Squirreltail and bluegrass would be expected to show the most immediate response and Idaho fescue and bluebunch wheatgrass the greatest long-term response.

SITE NUMBER 8, SAGEBRUSH/BLUEBUNCH WHEATGRASS-INDIAN RICEGRASS (61,000 ac.)

This site would be expected to show only slight improvement in range condition. It is the driest big sagebrush association and contains only a few remnant grass species. Bluebunch wheatgrass, which dominates this site at climax, has been eliminated from all stands sampled. This site is rated in "fair" ecological condition primarily because of the relatively large amount of sagebrush which is present in climax stands (20 percent). Squirreltail and Indian ricegrass would demonstrate slight increases. This site would remain in "fair" ecological condition under all management proposals.

SITE NUMBER 9, BIG SAGEBRUSH/BLUEBUNCH WHEATGRASS (92,000 ac.)

Moderate soil moisture conditions contribute to the significant potential for improvement on this site. Noticeable improvement in range condition would be expected. Bluegrasses and squirreltail would be expected to show an immediate response although bluebunch wheatgrass would likely show the greatest long-term response. Perennial forbs, which presently occur in only trace amounts, should become more abundant. Range condition would be expected to improve from "poor" to "fair" under all management proposals.

SITE NUMBER 10, BIG SAGEBRUSH/IDAHO FESCUE (2,000 ac.)

The potential for improvement of this site is high. It is relatively moist and perennial grass and forb species are common. Since it is located only within the proposed custodial management area, specific responses could not be predicted. Idaho fescue, needlegrasses, Sandberg bluegrass, and various forbs would increase if proper grazing management techniques were to be applied.

SITE NUMBER 11, BIG SAGEBRUSH/BASIN WILDRYE (85,500 ac.)

Variable improvement in range condition would be expected for this site. The moderate to moist soil conditions during spring and early summer are conducive to the establishment of perennial grasses. However, perennial grass understory is variable throughout the study area and improvement in range condition would correspond accordingly. An overall improvement from "poor" to "fair" condition would be predicted for all management proposals although some areas would remain in "poor" condition. Fall and early winter grazing would have the most beneficial impact on this site; however, the perennial grass understory appears to be extremely sparse in other areas affected by this management. Squirreltail, basin wildrye, and Thurber needlegrass would be expected to show the most noticeable response.

SITE NUMBER 12, JUNIPER-BIG SAGEBRUSH/BLEUEBUNCH WHEATGRASS (32,500 ac.)

This site would be expected to show moderate improvement in range condition. Squirreltail and Sandberg bluegrass would be expected to show the greatest response. Range condition would be anticipated to improve from "poor" to "fair" under all management proposals.

SITE NUMBER 13, BITTERBRUSH/IDAHO FESCUE (113,500 ac.)

Response on this site would vary with the grazing management system. This site currently has a large number of shrub, grass, and forb species present. Soil moisture is conducive to quick vegetative recovery. The greatest response would occur under no grazing, prescribed grazing, grazing once every third year, and the four-pasture grazing system, all of which satisfy the growth requirements of shrubbery as well as herbaceous species. Site improvement would be from "poor" to "good" condition under these grazing management proposals with bluegrasses, Idaho fescue, Thurber needlegrass, bitterbrush, and numerous forbs showing significant increases.

Rate of recovery under the three-pasture grazing systems would not be as rapid. Despite moderate-use limitations, areas adjacent to water would receive heavy use. Bitterbrush would not be expected to improve noticeably on these areas. Overall site condition would be predicted to improve from "poor" to "fair" condition under this management proposal.

The fall and early winter use areas would be adversely affected. The relatively high protein content of bitterbrush in relation to perennial grasses results in a preference for bitterbrush by livestock, causing heavy utilization of this species annually. Decreased vigor and abundance of bitterbrush would, therefore, be anticipated. Grasses and forbs, however, would respond favorably. Due to the high percentage of bitterbrush in climax communities, this site would be predicted to still be in "poor" ecological condition in 20 years on these use areas.

SITE NUMBER 14, MOUNTAIN MAHOGANY/WESTERN NEEDLEGRASS (500 ac.)

Site improvement potential is good here. Soils are relatively moist, and perennial grass and forb species are common. Since it is located only within the proposed custodial management area, specific responses could not be predicted. Western needlegrass and bluegrasses would be expected to increase if proper grazing management were to be applied.

SITE NUMBER 15, SILVER SAGEBRUSH/MAT MUHLY (4,000 ac.)

This site would be expected to demonstrate noticeable improvement in range condition. Soils are very wet during the spring and are favorable for reestablishment of herbaceous species during early summer. Mat muhly, squirreltail, and perennial forbs would be expected to increase in abundance. This site should improve from "poor" to "fair" condition under all management proposals.

SITE NUMBER 16, BALTIC RUSH (2,000 ac.)

This site would show noticeable improvement in range condition. The spring and early summer are wet. Other conditions as well are favorable for the improvement of Baltic rush. The condition of this site would improve from "fair" to "good" under all management proposals.

SITE NUMBER 17, SLENDER WHEATGRASS (1,000 ac.)

The selected grazing management proposal would dictate site response. Under no grazing, or prescribed grazing, very noticeable improvement would occur. Aspen stands that have not been degraded to the point that juniper, sagebrush, and other shrubby species have invaded would closely resemble aspen communities in climax conditions. Aspen, slender wheatgrass, mountain brome, big bluegrass, and numerous other grasses and forbs would show dramatic increases. Aspen stands that presently contain a large percentage of sagebrush and juniper would respond less quickly. These invader species retard vegetative recovery and would likely be part of the vegetative community in 20 years unless additional management measures, such as burning or chopping, were to be taken.

Response of aspen stands under other grazing management proposals would be considerably more limited than previously described. Moderate and light use limitations would regulate livestock use but livestock would continue to concentrate on aspen stands during use years.

Injury to aspen sprouts has long been known to be proportional to grazing intensity (Baker, 1918; Sampson, 1919). Exceedingly light grazing by sheep, moderate grazing by cattle, or full protection for sufficient time periods have been recommended for successful aspen regeneration. In some cases, at least three years of protection have been recommended (Sampson, 1919). The USDA, Forest Service (1970), recommends three years of protection from sheep and five years from cattle. However, aspen reproduction has been observed to be successful under three-pasture rest-rotation grazing systems on similar ranges where, under continuous grazing, successful reproduction failed (Hormay, 1978, personal communication).

Aspen stands located in management areas which would not receive complete rest, but which are situated where they would not receive heavy grazing pressure, would be predicted to improve. The rate of individual stand improvement would be proportional to the degree of utilization, a function of the amount of rest included in the grazing system. The response under various systems in decreasing order is: (1) light grazing once every third year; (2) light grazing every other year; (3) moderate grazing every other year and; (4) moderate grazing two out of three years.

Aspen stands receiving fall grazing would not improve. Livestock would concentrate on these areas each year and prevent aspen sprouts from surviving. Understory herbaceous species, however, would respond favorably and would approach no grazing conditions.

SITE NUMBER 18, TUFTED HAIRGRASS-BLUEGRASS (500 ac.)

This site would be expected to show considerable improvement in range condition under all management proposals. Soil moisture conditions and species composition are extremely favorable for improvement in those communities where headcutting has not lowered the water table. Bluegrass, tufted hairgrass, and sedges would be expected to show the greatest responses. Increased abundance and diversity of perennial forbs would also be anticipated. Although livestock use of this site would be heavier than on adjacent areas, a progressively "good" condition would be anticipated under all management proposals. No-grazing areas or fenced meadows would improve to "excellent" condition.

SITE NUMBER 19, WILLOW/TUFTED HAIRGRASS-BLUEGRASS (2,500 ac.)

Response on this site would vary with the management proposal selected and degree and frequency of utilization. Under no grazing and prescribed grazing, an improvement from "poor" to "excellent" condition would be expected where willows are a conspicuous component of the community. Where willow has been completely eliminated, range conditions would be lower. Bluegrasses, tufted hairgrass, sedges, and numerous perennial forbs would be expected to show noticeable improvement.

Because this site serves as a livestock concentration area, heavy use would be anticipated during use treatments. Willow sprouts would be grazed and reproduction retarded. It would be anticipated that these communities would improve from "poor" condition to "fair." Although willows would improve slightly, they would be less abundant than under no-grazing conditions. Response rate for this site under grazing systems would be the same as that described for aspen sites.

Appendix K

BROWSE CONDITION STANDARDS

The following browse condition standards are based on Range Environmental Analysis Handbook, (U.S. Forest Service, California Region, 1969, Sections 740, 751, 760, 852.3).

BROWSE FORM CLASSES

1. All available, little or no hedging.
2. All available, moderately hedged.
3. All available, heavily hedged.
4. Largely available, little or no hedging.
5. Largely available, moderately hedged.
6. Largely available, heavily hedged.
7. Mostly available.
8. Unavailable.

These browse form classes are arbitrary divisions that aid in describing the condition of the browse stand. Classification of browse in Class 8 (Unavailable) may be the result of height (over 5 feet), location (near a rock or cliff), or density. Degree of hedging is the amount a shrub or tree is browsed back from its normal shape. Hedging is the result of past use and should not be confused with current cropping. Lightly hedged shrubs are browsed to the extent that there is loss of vigor and indication of decadence. All others should be classed as moderately hedged.

CONDITION OF BROWSE STANDS

1. Satisfactory--Not more than 15 percent of preferred species or 5 percent of staple species in Form Classes 3 and 6 (heavily hedged).
2. Unsatisfactory--(a) More than 15 percent of preferred species or 5 percent of staple species in Form Classes 3 and 6 (heavily hedged).
(b) Preferred species have declined to remnant stage or minor occurrence relative to site potential as determined from evidence of death loss. Where staple or low-value plants appear as sole components of the browse stand, condition may be rated as satisfactory if less than 5 percent of staple plants have been heavily hedged.

GAME RANGE CONDITION STANDARDS

1. Satisfactory--Condition of browse "Satisfactory," and no active accelerated erosion.
2. Unsatisfactory--(a) Condition of the browse "unsatisfactory" regardless of soil condition. (b) Condition of browse "satisfactory," but active accelerated soil erosion present on area.

Appendix L

STREAM SURVEYS

The objective of stream surveys is to provide a record of the condition of the aquatic habitat as it relates to fish. Included is an analysis of chemical elements present in the water and the aquatic foods available for fish. Survey procedures are outlined in BLM Manual Chapter 6671, "Stream Survey."

SURVEY UNITS

Each stream surveyed is given a starting point (downstream terminus) and a termination point (upstream terminus). Each terminus generally corresponds to a property boundary, stream origin, and/or stream termination point. Intervals of 0.25 mile are paced off, permanently marked and numbered in order to accurately determine distance and location points along the stream. A series of photographs are taken at each survey unit (0.25-mile marker).

GRAZING STATIONS

Permanently marked stations are set up at the upper and lower termini and above and below any confluents into the stream. Annual temperature, flow, stream depth, width, and water quality are measured here in order to monitor changing stream conditions.

PHYSICAL SURVEY

The following data are ascertained in each stream in order to assess aquatic habitat conditions.

1. Stream width--Wetted distance measured in feet from bank to bank.
2. Stream depth--Depth of pools measured in tenths of feet.
3. Stream flow--Measured with the aid of a water velocity meter in cubic feet per second.
4. Stream gradient--An estimate of slope from flat (0-1 percent) to steep (2.5 percent).
5. Turbidity--An estimate of water visibility of pools measured in feet.
6. Conductivity--Total dissolved solids present in the stream.
7. pH--The acidity or alkalinity of the stream.

8. Temperature--A continual 45-day record of high and low temperatures is collected with the aid of thermographs.
9. Dissolved oxygen--In ppm, the total amount of dissolved oxygen present in the water.
10. Condition of the benthos--An estimate taken of the number of square yards of good and marginal gravel, pools, riffles and rubble per 110 yards of stream.
 - (a) Gravel--All rocks measuring 0.1 to 3.0 inches in diameter:
 - (1) Good--Gravel with a minimum of silt and sand present in the interspaces;
 - (2) Marginal--Gravel measuring less than 0.1 but greater than 0.5 inches--Gravels in this category are generally shallow and compacted with silt and sand.
 - (b) Rubble--All rocks measuring 3.0 to 12 inches in diameter.
 - (c) Pools--All placid waters 1.0 foot or greater in depth.
 - (d) Riffles--Faster, shallower waters.
11. Vegetation
 - (a) Average stream area shaded--An estimate of the percent of stream area shaded by canopy and canyon walls.
 - (b) Streamside cover--The composition of the dominant vegetative communities along the course of the stream.
 - (c) Percent bank erosion--An estimate in each 110-yard subsection of the amount of bare streambank contributing directly to erosion.
 - (d) Emergent and submergent vegetation--An estimate of the number of square and linear yards of emergent and submergent growth per 110-yard subsection. Found 100 feet back from the stream:
 - (1) Tree community;
 - (2) Brush community;
 - (3) grass--forb community.

12. Biological data

- (a) Macro-invertebrate sampling--This sample is taken to determine the number and composition of desirable (caddis fly, stonefly, and mayfly larvae) and undesirable species (leaches, black fly larvae, giant water beetles and predaceous diving beetles) of fish food.
- (b) Measurements are taken with a surber sampler (square foot bottom sampler made of nylon mesh). Four samples are collected in each survey unit.

13. Limiting factors

- (a) Barriers--This includes the number, type, height, and corrections needed for each barrier identified. Barrier types include:
 - (1) Falls;
 - (2) Dams;
 - (3) Log jams;
 - (4) Culverts.
- (b) Pollution sites--This includes the identification and location of sources of pollution of the stream:
 - (1) Erosion sites;
 - (2) Campgrounds;
 - (3) Irrigation ditches.

14. Accessibility--Includes the identification of roads, bridges, trails, etc., which will aid future investigation. Indicate all public or private access that is available.

15. Additional comments--A listing of pertinent comments which may help in evaluating the habitat. This may include:

- (a) Influence of land-use practices on the stream;
- (b) Sketches and drawings of pertinent obstructions, pollution sites, etc.;
- (c) Improvement sites and recommendations.

16. Electro-shocking of fish--An electro-shocking program is developed to determine the species, size, abundance, and location of fish in each stream.
- (a) Permanent transects (100 yards long) are established in each stream prior to shocking.
 - (b) BLM and Department of Fish and Game cooperate in the sampling.
 - (c) All fish shocked are identified, sized, fin clipped, and returned to the approximate location from which they were taken.
 - (d) Population estimates (fish/100 feet of stream) are calculated following sampling.

Appendix M

COMMENTS CONSIDERED DURING EIS PREPARATION

MAX C. FLEISCHMANN COLLEGE OF AGRICULTURE

UNIVERSITY OF NEVADA RENO
DIVISION OF RENEWABLE NATURAL RESOURCES
920 VALLEY ROAD
RENO NEVADA 89512



RESIDENT INSTRUCTION
AGRICULTURAL EXPERIMENT STATION
COOPERATIVE EXTENSION SERVICE

Dept. of Interior

RECEIVED

MAR 8 1979

BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

March 6, 1979

Rex Cleary, District Manager
Bureau of Land Management
P. O. Box 1090
Susanville, NV 96130

Dear Rex:

This is a follow up to our recent discussions of the rationale used to determine initial stocking rates in the Cowhead/Massacre unit as described in a Draft of Chapter 1 prepared several months ago. I have worked with Dr. Wayne Burkhardt in preparing these comments. We hope they will be useful.

I believe your concern is primarily for the validity of the procedures used. As I understand it you have:

- a. used a 1963 range survey as the base,
- b. recognized resultant reductions of 20-63% made in 1965 and 1968,
- c. determined from 1973 and 1977 surveys that range conditions are poor and showing little improvement,
- d. estimated current livestock use and utilization,

and then adjusted current livestock use by:

- e. the % of the area to be rested each year, and
- f. by an additional % necessary to bring present utilization to the desired % utilization, and
- g. finally, allowing a % increase from this to recognize increased forage volume produced as a result of a later turn-out date.

I will try to offer comments about each of these steps in the process.

- a. Use of the 1963 Survey - We believe this is a proper starting point IF you don't have adequate trend and actual use data. Further, we do not believe a SVIM survey would give you any more reliable or supportable data for an "initial stocking rate". As stated by Stoddard, Smith and Box (1975. Range Management, pg 186) "Regardless of the technique used, all methods" (for determining grazing capacity) "thus far developed based on vegetative analyses yield only an estimate of grazing capacity. True grazing capacity can be determined only by stocking with an estimated number of animals and watching the range trend."

- b. Recognizing 20-63% Reductions Made Following the Survey in 1965 and 1968. This raises more questions than it answers. Apparently you assume that since these earlier reductions did not bring about the desired changes in vegetation, further reductions are mandated. We could argue (as has Hormay) that this is an indication that livestock numbers may not be the management problem. Also, were these actual or "paper" reductions?

With an actual reduction of this magnitude you would expect at least some favorable response in terms of condition and trend in ten years, if livestock numbers were the major management problem. Have you considered climatic conditions over the past 20 years? Or population trends of other herbivores - deer, antelope, rabbits, grasshoppers, wild horses? Are there substantial areas where the climax vegetation is so deteriorated and/or where the less desirable shrubs and forbs have become so dominant that no favorable response could occur through manipulation of grazing use alone?

Has the unsatisfactory response been general over the whole planning area OR are there areas where there has been significant favorable response as well as areas where there is continued marked deterioration? If the latter is true, a thorough analyses of typical sites in both categories should lead you towards some more specific and supportable management prescriptions. If the former is the case, perhaps you need to take another look at your data, your procedures, your statistical reliability, the validity of your site capability information, etc. Certainly you can locate, compare and analyze areas that have been used beyond surveyed capacity (trespass, wild horse concentration areas) and below it (when an allottee has taken significant non-use for several years, for example).

- c. Determinations from 1973 and 1977 Condition and Trend Surveys that Range is in Poor Condition and Showing Little Improvement. If these studies were reasonably reliable, they could be used directly along with actual use and utilization data (without the proposed mathematical manipulations) to adjust stocking rates where needed as well as to determine other management and range improvement prescriptions. From our limited look at the survey data, I am sure it is not that reliable and I believe you and most of your staff agree. If this is true, then I think it is very misleading to make the unqualified statement: "Range condition and trend surveys in 1973 and 1977 indicate ranges were in poor condition and showed little improvement." It also provides very questionable support for the management assumptions and proposed decisions that follow. Even if the data were reliable, it is not very helpful for necessary site specific interpretation if described only in broad relation to the entire planning area (1 million acres).
- d. Estimated Current Livestock Use and Utilization. To compare actual use with utilization, you must first estimate all actual use, even though the adjustment may only be made in livestock use. Also, it should be known whether the % utilization determined is the average of the entire allotment or of key areas. Both methods have merits and problems. And, each should be interpreted differently. However,

neither method can be used as more than a rough guide for stocking adjustments. A reduction in numbers simply will not reduce utilization uniformly over the use area. More often, it will have little effect on the most utilized areas and only substantially reduce use on areas now much less utilized - unless other management actions are taken. And, if these other actions are taken the reduction may not be necessary. You'll never really know if you take the actions simultaneously.

If a utilization study, representing an entire allotment or other management unit, indicates and average and relatively uniform utilization beyond that desired, obviously a reduction is indicated - provided the year is "normal" in terms of climate and other factors. In such cases a reduction based on the relationship between present and desired overall utilization would seem a reasonable procedure. But, if utilization is quite variable over the unit, the reduction alone cannot be expected to correct the situation. Something else must be done to promote better distribution of use or a system must be designed to minimize impacts of distribution. If, on the other hand, the average utilization is within acceptable standards, it would seem to be sound management to correct distribution problems before calling for reductions.

If the utilization study is based on "key areas", we don't believe a direct adjustment can be supported based on a direct relationship between present and desired use of such areas. First, only trial and error can determine the actual reaction to a unit wide stocking rate. Second, the problem - or the solution - may have nothing to do with total livestock use in the unit.

I suppose "key areas" could be used in the same manner as a unit wide utilization study but this would require a different concept of "key areas" than is generally accepted now. That is, key areas would have to be selected to truly represent all conditions within the unit. One or a few "average" sites would not tell the story.

- e. Adjustment for the % of Area to be Rested Each Year. This flies against most of the prevailing wisdom about grazing systems. Correct % utilization, carrying capacity estimates, proper use factors and similar "guides" are generally based on season long use. It is pretty well accepted that greater use can be made of individual plants or range areas without undesirable effects: if grazing is deferred, is in short rotations during the growing season, occurs after most plant processes are completed, or if annual rest is provided periodically. Thus, there may be no reduction necessary to begin a grazing system. Certainly a reduction based on area rested cannot be supported as a standard rule. Hormay does not suggest it, BLM has not in the past, and as I read BLM Instruction Memo 79-24 of October 13, 1978, BLM still does not except, in some cases, during the first year.

If an adjustment is made to go into a grazing system, we believe it should be based on conditions as judged by a locally knowledgeable professional at the time the change is made and that judgement should

be supported in writing by the "judge" with relevant available data and a clear rationale. Certainly any reductions to go into a system should be considered temporary non-use.

Finally, in your illustration, you indicate that 50% of the area would be annually rested. Area "E" shows a 4 pasture R-R system. We would think only 25% would need to be rested (at least initially).

- f. Adjustment to Bring Use to Desired Percent Utilization. This has been covered under "d" above.
- g. Allowing a % Increase in Recognition of Increased Forage Volume Produced As a Result of Later Turn Out Date. This is probably valid in concept but I don't know that any exact % could be supported in any special allotment. Also, if you add in this plus percentage, isn't it just as valid to consider a factor for increased vigor and carry over feed resulting from the system? Or, improved distribution from new water developments, fences, etc.?

I don't know if all of this is very helpful to you. We have been critical of much of the rationale and many of the procedures used in developing your proposals for "Allowable Livestock Use". If it is any consolation, it is likely that we could be just about as critical of any other procedures you might select - including a new range survey. This is because there simply is no method that is scientifically indisputable.

This is not the fault of the range profession. It is the fault of Mother Nature. Proper stocking rates can only be developed through trial and error and should still vary from year to year and over the years. There is no way to predict precisely how much forage a particular range will produce in any given year OR how any particular mix of grazing animals will utilize it.

It is unfortunate for all of us that BLM has placed so much emphasis on "initial stocking rate" in developing range management programs for EIS Review - But this is a whole "nother story". However, it is compounded here by the dimensions of the reductions proposed. As I tally it from my copy of Chapter 1 (see attachments), the proposal calls for an overall reduction of 47% in use by livestock, wild horses and wildlife - and a 53% reduction of livestock. I cannot see how such large reductions can be supported by the data at hand or by the evidence on the land as observed by experienced, knowledgeable people. And, surely such large reductions will be challenged by those that would be directly or indirectly negatively affected. Therefore, if you go this route, I believe it will be long after 1983 before you can begin to implement an improved range management program - if, indeed, you will ever be allowed to implement this program.

So I am suggesting to you that you take a more moderate approach to initial stocking on the assumption that further adjustments can be made as additional information becomes available - from condition and trend studies, utilization and actual use data, and results of range improvement projects and grazing systems implemented. Also, stocking rates proposed in the EIS can be adjusted if necessary before actual licensing in 1983 in response to new data or changed conditions.

This is simply not a short range expedient at the expense of long range benefits as some BLMers and some others like to make it seem. Rather, it is a sound, realistic approach with a far higher promise of success than the "over-kill" approach now proposed - at least we think so.

One way you might develop initial stocking rates that would have at least as supportable a rationale as you now propose follows. It uses the same management area as you use in Chapter 1 and assumes that "current livestock use" equals the 1963 surveyed carrying capacity.

MANAGEMENT AREA E, MASSACRE/NUT MT

1963 Surveyed Capacity - 17,284 AUM's

	<u>Existing and Proposed Use</u>		<u>Change</u>
	<u>Existing</u>	<u>Proposed</u>	<u>% Diff</u>
Livestock	17,284	5,531	- 68%
Wild Horses	2,700	2,007	- 26%
Wildlife	1,351	1,794	+ 32%
Total	21,335	9,332	- 66%

Existing Livestock Use

(?) 2881 C - 4/16-10/15 = 17,284 AUM's (Season Long?)

Presently Proposed Livestock Use

1580 C - 6/15-9/30 = 5,331 AUM's

4 Pasture Rest Rotation - 2 Pastures Rested Each Year
Starts 1983

Proposed Improvements

10 springs
10 stock ponds
5 wells
5 acres sensitive area fencing
50% max. of meadows fenced
All to be completed 1981 and 1982

ALTERNATIVE METHOD FOR ESTABLISHING INITIAL LIVESTOCK USE

Existing Carrying Capacity	17,284 AUM's
Reserved for Wild Horse (after reductions)	-2,007 "
	<u>15,217 "</u>
Reserved for Existing Wildlife Use	-1,351 "
Proposed Initial Base Livestock Stocking Rate	<u>13,866 AUM's</u>

This base livestock stocking rate implies an initial reduction of 20% $\left(\frac{13866}{17284}\right)$ rather than the 68% $\left(\frac{5531}{17284}\right)$ in the proposal and, assuming the 1963 survey was reasonable, allows for initial use at the surveyed carrying capacity. Actually it should allow for at least a small margin towards conservatism since (1) the ocular survey allows for some additional wildlife use in developing the "Forage Acre Requirement" and (2) wildlife and livestock AUM's are not wholly competitive.

COWHEAD/MASSACRE USE DATA

(Compiled and Interpreted from
a Draft of Chapter I, DEIS)

	Livestock		Wild Horses		Wildlife		Total	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
High Rock	5000	0	3600	0	556	1041	9156	1041
Massacre	22806	7904	5724	3969	1765	2367	20295	14240
Long Valley	15496	9555	468	468	1346	1827	17310	11850
Mosquito	18612	11884	1296	567	1879	2360	21787	14811
	61914	29343	11088	5004	5546	7595	78548	41942
% Change	-53%		-55%		+25%		-47%	

$$\frac{\text{Existing Use}}{\text{Livestock Use}} = \frac{78548}{61914} = 27\% \text{ Current Overuse}$$

(Also assumed survey C.C.)

$$\frac{\text{Existing Livestock \& Wildlife Use + Proposed Wild Horse Use}}{\text{Surveyed Carrying Capacity}} = \frac{72464}{61914} = 17\%$$

Thus if additional reduction to carrying capacity is to be all made from current livestock use, the reduction would average 17% (in numbers or time - if early season reduction, the % could be less)

Area "E" - Massacre/Nut Mountain

	Existing	Proposed	% Change
Livestock	17824	5531	68% Red.
Wild Horses	2700	2007	26% "
Wildlife	1351	1794	32% Inc.
Total	21335	9332	66% Red.

- Proposed: 4 Pasture Rest Rotation - 6/15-9/30 (2 yrs rest in 4 yrs)
Utilization Light
Fence up to 50% of Meadows
+5 Acres Fenced Sensitive Habitat
10 springs, 10 stock ponds, 5 wells
Improvements Complete 1981-82, Grazing System 1983

There are some other arguments that can support this as a conservative process. Even though the 1963 survey may be suspect as too liberal, in this case you are proposing a shorter, later season that should produce more forage and better provide for the physiological needs of the plant. You will also be providing 25 new water developments which should improve use distribution for all animals and some fencing to protect sensitive areas before the new stocking rate is implemented. In addition, you should have the option to adjust the base stocking rate the first year of the system (or to provide for early removal) should this be necessary. Also, the system does not have to be fully implemented the first cycle. Even if half the area must be rested each year - which is hard for me to accept - you could start with a 25% rest the first cycle.

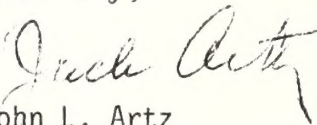
It is true that this rationale does not initially provide for increased wildlife AUM's. However, wildlife will not suddenly appear just because they are provided for. If vegetative response is not rapid enough to encourage increased wildlife, further livestock reductions can be made if livestock numbers prove to be the problem.

One final point: In this particular example, at least, no consideration has been given for improvement through vegetative manipulation. In this area, I am sure this offers the possibility of meeting all the land use goals with even less impact on the ranchers and local community. Further, by failing to consider these techniques we believe you are condemning some large areas to continued non-productivity for virtually all uses and values regardless of stocking rate or management system.

We recognize that this "more moderate approach" suffers from many of the shortcomings we noted in your approach. However, we believe it is at least as valid and supportable, that it has as reasonable chance for "on-the-ground" improvement of conditions, that it can meet reasonable management goals, and that it has a far better chance of being accepted and implemented with the positive support and cooperation needed for any program to be successful. AND, it could be implemented with only about a 17% overall livestock reduction (or maybe less) rather than the 53% proposed - (see attached).

Thank you, Rex, for the opportunity to comment. If you wish to pursue any of these ideas further, please let us know.

Sincerely,



John L. Artz
Range Scientist

JLA/bjs
Enc.

c/n

UNIVERSITY OF CALIFORNIA
AGRICULTURAL EXTENSION SERVICE

DAVIS, CALIFORNIA

EXTENSION WILDLIFE AND SEA GRANT
554 Hutchison Hall

March 7, 1978

Mr. Deane Swickard
Area Manager
Surprise Resource Area
Bureau of Land Management
P.O. Box 460
Cedarville, California 96104

Dept. of Interior
RECEIVED
MAR 9 1978
BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA
DEPT. OF INTERIOR
RECEIVED
MAR 10 1978
BUREAU OF LAND
MANAGEMENT
CEDARVILLE, CALIFORNIA

Dear Deane:

Thank you for the opportunity to participate in the B.L.M./rancher/conservationist meetings in Cedarville. What we experienced was an outstanding example of compromise achieved by intelligent people who were willing to listen and understand the views of others. Needless to say, I was impressed.

Our first task was to discuss the problems associated with the High Rock Canyon area and develop a series of alternatives. Our overall objective was to develop a plan that would provide a healthy environment for both wildlife and livestock. In considering plans, the group felt that the important things to consider were archaeology, wildlife and livestock. The area is presently in need of protection from grazing animals and public use.

Alternative A (First preference)

- (1) A wilderness designation should be assigned (beginning at High Rock Canyon and extending eastward)
- (2) Wild horses and burros should be controlled^(*)
- (3) Domestic sheep grazing should continue but be restricted west of the canyon area by fencing
- (4) Livestock grazing should be on a prescribed basis only^(**)
- (5) Public use of the area should be restricted and tightly controlled
- (6) Bighorn sheep should be reintroduced into High Rock Canyon

*Control can include total elimination or reduction to the carrying capacity of the range and maintenance at that level. Under no circumstances should these animals be allowed to exceed the carrying capacity.

**Prescribed grazing means the use of cattle as a management tool to improve the range and utilize surplus forage. Their use will be on an intermittent basis (if at all) according to conditions. This use should in no way adversely affect the range, wildlife populations, or the archaeology of the area.

Alternative B (Second preference)

- (1) A wilderness designation should be assigned for the entire High Rock Canyon area
- (2) No wild horses or burros
- (3) Domestic sheep grazing should continue with range improvement^(*)
- (4) Cattle grazing should continue with certain range improvement modifications^(**)
- (5) Public use of the area should be restricted and tightly controlled
- (6) Bighorn sheep should not be reintroduced

*Range improvement for sheep means to maintain grazing as is but continue to measure range conditions to insure that this is not restricting to any noticeable extent the recovery of the range. If it is restricting range recovery, appropriate restrictions should be initiated.

**Cattle grazing should be restricted in time from the point where range readiness (for cattle grazing) is achieved until moderate use is reached. This grazing time will be approximately from June 15 to September 15, depending on range conditions. If needed to achieve proper range health, a decrease in cattle numbers may also be necessary.

Alternative C

- (1) A wilderness designation
- (2) No wild horses or burros
- (3) No domestic livestock grazing (prescribed grazing only)
- (4) Reintroduce bighorn sheep
- (5) Public use restriction

Alternative D

- (1) A wilderness designation
- (2) Control of wild horses and burros (discussed earlier)
- (3) Cattle grazing should continue with certain range improvement modifications (described earlier)
- (4) No domestic sheep
- (5) Public use restriction
- (6) Reintroduce bighorn sheep

Alternative E

- (1) No wilderness designation
- (2) Control of wild horses and burros (discussed earlier)
- (3) Domestic sheep grazing should continue with range improvements (discussed earlier)
- (4) Cattle grazing should continue with certain range improvement modifications (described earlier)
- (5) No bighorn sheep reintroduction
- (6) Public use restriction

Alternative F

- (1) No wilderness designation
- (2) Control of wild horses and burros (discussed earlier)
- (3) No domestic livestock grazing (prescribed grazing only)
- (4) Reintroduce bighorn sheep
- (5) Public use restriction

General Comments

- (1) For all six alternatives, it was strongly felt that wild horses, burros, cattle and sheep should be excluded from the canyon proper to protect the archaeology and wildlife of the area.
- (2) Everyone felt that cattle and sheep grazing should be continued, as long as they were closely managed and did not adversely affect range health.
- (3) Use of alternative areas for domestic sheep grazing should be investigated in case it is decided that the High Rock Canyon area should not be used for this purpose. By doing this, the sheep operator can stay in business.
- (4) The decision to eliminate all wild horses and burros or to reduce and maintain their numbers at a lower level was reached because they are damaging to range conditions, they often damage water developments, periodical roundups cause damage, it is not wise to attract horse viewers to the area, and a large number of wild horses are available for public viewing within five miles of this area.
- (5) Range condition should be measured at regular intervals to determine rate of recovery under the new management plan.

The second problem involved management of the Sheldon/Cowhead-Massacre Unit. Of particular importance in this area is the poor range conditions, and wildlife habitat management plans that must be coordinated with the Sheldon Refuge. The alternatives for management of this area were easily formulated since they only involved one basic conflict area.

Mr. Deane Swickard

March 7, 1978

Page - 4 -

Alternative A (Preferred)

- (1) Wild horses and burros should be controlled (discussed earlier)
- (2) Cattle grazing should continue with certain range improvement modifications (discussed earlier)
- (3) Alternative grazing areas should be developed to accommodate cattle during early spring and late fall (the times in which they can no longer be used on this unit). Areas to be developed should have a low wildlife value classification.

Alternative B

- (1) No domestic livestock grazing (prescribed grazing only)
- (2) No wild horses or burros

Alternative C

- (1) Domestic livestock grazing should continue as is
- (2) Wild horses and burros should be controlled (discussed earlier)

The last problem involved the Massacre Lakes area, an important archaeological site. There was complete agreement on the management program needed for this area so only one alternative was developed.

Alternative A (Preferred)

- (1) Critical archaeological sites should be fenced
- (2) Land exchanges should be made so that all land within this area will be federally owned
- (3) Water developments outside the fenced area should be constructed for livestock use
- (4) Alternative grazing areas should be developed for cattle to ameliorate the loss of forage due to fencing. Areas to be developed should have a low wildlife value classification.
- (5) Public use of the archaeological site should be restricted and tightly controlled

Well, Deane, this covers the action of our group. As an aide in future discussions, I would suggest that the size of the groups be decreased. We have successfully accomplished the needed compromises and, hopefully, future endeavors will be more of the specific management details and considerably less soul-searching.

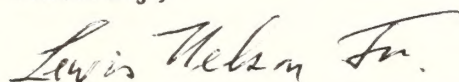
Mr. Deane Swickard

March 7, 1978

Page - 5 -

Please keep me informed.

Sincerely,

A handwritten signature in cursive script that reads "Lewis Nelson Jr.".

Lewis Nelson Jr.

Extension Wildlife Specialist

LN:sg

cc: Rex Cleary



MIKE O'CALLAGHAN
GOVERNOR

GLEN K. GRIFFITH
DIRECTOR

1100 VALLEY ROAD

P.O. BOX 10678

RENO, NEVADA 89510

TELEPHONE (702) 784-6214

May 31, 1978

Mr. Rex Cleary
District Manager
Bureau of Land Management
P.O. Box 1090
Susanville, California
96130

Dear Rex:

The department appreciates the opportunity to participate in the experimental ES development process being conducted for the Cowhead and Massacre planning units. As our personnel indicated at the close of the session at Cedarville May 23, 1978, the department feels that further comment on the proposed land use alternatives is necessary. Several reasons mandate this additional input. Foremost, because of the brief time for thought and discussion in our meetings, the opportunity to examine the proposed alternatives was not sufficient to consider possible ramifications. In certain instances, a particular discussion group had no time to consider the prepared alternatives other than those already selected as preferred by the resource area personnel. The compression of time for consideration of alternatives by user groups and resource agencies may be desirable in abbreviating the plan development process, but it may also represent the greatest weakness of the approach because comprehensive examination may not occur. The department feels strongly that, as an agency responsible for management of valuable resources occurring within the planning units, we need more time for consideration and staff consultations. Also, to be candid, the consensus from a planning group numerically dominated by livestock operators and personnel from agencies sympathetic with livestock interests may not fully consider wildlife needs.

The department is in full agreement with your district's efforts to expedite and reduce the cost of the ES development process, but it should not be done at the expense of the resources involved. Should serious deficiencies or conflicts with wildlife values become evident further into the planning process, avenues for input should be made available to the department. Further meetings and/or opportunities for written input should be considered.

To aid in the present effort, the department offers the following comments:


1. The overriding objective of minimizing disruption of the local social and economic structure should receive less emphasis or be eliminated. Obviously, these considerations are serious, but they seem to be outside the intent of the NRDC suit for statements on the impact of cattle grazing on Bureau lands. The district's emphasis of this single-purpose objective appears to have hindered the development of realistic and objective grazing management schemes for improving all resource values. The maintenance of the family-operated ranch may not be within the realm of your agency's management capabilities, particularly considering present economic trends.
2. The five areas designated for dominant use plans appear to have been selected arbitrarily. Recognizing that these areas may consolidate areas with similar grazing management problems, we feel that in some instances they fail to consider common resource values extending beyond their perimeters. As an example, the Macey Flat-Rye Creek area north of the Sheldon Refuge (T47N,R21E, T46N,R21E) represents antelope and deer range used by Sheldon populations which at times may equal the Massacre Bench area in importance. This area should be included in Sub-Unit 2.
3. The concept of a dominant land use value, and therefore the development of a dominant-use plan which considers other values, is valid. A spade should be called a spade, but in several instances this does not occur. The most obvious example is in Sub-Unit 2. With no cattle reductions, the potential to cause range and habitat damage appears more severe than under the status quo. A second example is in Sub-Unit 1 (High Rock Canyon), where the preferred alternative presents management strategies the department considers mutually exclusive, i.e. bighorn reintroduction versus continued domestic sheep grazing.

Mr. Rex Cleary
May 31, 1978
Page 3

4. The proposal that more than 130,000 acres be considered for vegetative manipulation to increase livestock forage to compensate for losses because of shorter grazing seasons and lower levels of use represents a serious threat for many wildlife values. Many of the areas capable of treatment have high values for wildlife. Also, considerable treatment has already occurred within the planning unit.

Your consideration of these points would be welcomed, and we suggest further interchange between our agencies regarding the Cowhead-Massacre planning effort. Specific recommendations by our department to the Cowhead-Massacre planning unit proposals and alternatives will be forthcoming by June 12, 1978.

Sincerely,


William G. Parsons
Acting Director

/vn

cc: Edward L. Hastey, Sacramento
Deane Swickard, Cedarville
Region I Supervisor

MA. C. FLEISCHMANN COLLEGE OF AGRICULTURE

UNIVERSITY OF NEVADA RENO
DIVISION OF RENEWABLE NATURAL RESOURCES
1000 VALLEY ROAD
RENO NEVADA 89512



RESIDENT INSTRUCTION
AGRICULTURAL EXPERIMENT STATION
COOPERATIVE EXTENSION SERVICE

July 26, 1978

Mr. Rex Cleary, District Manager
Susanville District Office
Bureau of Land Management
P. O. Box 1090
Susanville, CA 96130

Dear Rex:

I appreciate your providing me a copy of Draft Chapter 1 of the Cowhead/Massacre DES as well as the time you have taken to personally discuss related matters with me. I believe we clearly understand each others concerns and frustrations and are both still hopeful that something can be salvaged from efforts to date in terms of ultimately producing a good plan for Cowhead/Massacre as well as a model for future grazing EIS's. However, at this point, I think it may be useful if I make a record of some of my concerns.

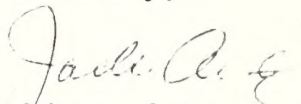
- 1) I think Chapter 1 is the clearest presentation of proposed actions I have yet seen in a grazing EIS. The presentation is straight forward and to the point.
- 2) I think the actions proposed in Chapter 1 are pure "overkill". If there are three possible or alternative treatments to relieve a physical condition in a human patient, a doctor does not immediately prescribe all of them at once for some very obvious reasons. Also, the proposal appears to have been developed on the concept that if one teaspoon of salt will improve the cookie recipe, three or six will make it even better. My knowledge of the area and review of available data provides no justification for many of the radical and compounding actions proposed. I am convinced that, if these actions are implemented as indicated, the range livestock industry and related life style of Surprise Valley and Northern Washoe County will be destroyed.
- 3) I believe BLM (at the national level as well as locally) had an obligation to propose actions in Chapter 1 that followed as closely as possible the recommendations developed by the advisory group. Group proposals that were "bad" would be exposed in Chapter 3 and could be mitigated in Chapter 4. This is the same manner you indicate you may be able to "improve" the present Chapter 1. In both cases you still would have the Final EIS to present a more "BLM-acceptable" proposal if you wish. The point is: a lot

of us devoted a lot of time and effort to this project in good faith and in the hope that we might help BLM find some solutions to some serious procedural problems. Many of us, including many of the "environmental group" participants, now feel that BLM has bungled the job one more time.

- 4) I understand that the final action may be vastly different from the proposal following EIS consideration of impacts, alternatives and mitigating measures. However, I can see no justification for starting with a proposal so obviously radical and unacceptable in the view of so many that are the most directly concerned. It is especially objectionable when it follows special efforts to involve many of these same people effectively in the planning effort. Chapter 1, to these people, is a double-cross pure and simple.
- 5) I believe a serious strategic error was made in presenting Chapter 1 to non-resident environmental groups first and waiting at least a week to present it to the local involved ranchers. This reinforced the local feeling that BLM had sold out to the national environmental groups. There is no question in my mind that if there was any intent on BLM's part to continue coordination and cooperation among the various interest groups - as well as BLM's own credibility - Chapter 1 should have been presented and explained first at a meeting in Cedarville of the groups represented at the previous meeting.

I am sure you will read this as a pretty negative statement and I intend it that way. I think it is important for BLM to realize just how serious the situation is. However, I do not want you to read into this any indication that I am unwilling to work with you further. To the contrary, if there is anyway we can pull the chestnuts out of the fire, I am very anxious to help. I still think you and Deane had a helluva idea and I admire and support you for the efforts you have both made.

Sincerely,


John L. Artz
Range Specialist

JLA/bjs



Dept. of Interior

RECEIVED

AUG 4 1978

BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

MIKE O'CALLAGHAN
GOVERNOR

GLEN K. GRIFFITH
DIRECTOR

1100 VALLEY ROAD

P.O. BOX 10678

RENO, NEVADA 89510

TELEPHONE (702) 784-6214

August 2, 1978

Mr. Rex Cleary, District Manager
Susanville District, Bureau of Land Management
P.O. Box 1090
Susanville, California 96130

Dear Rex:

Please pardon our delay in responding to your latest revision of the Cowhead/Massacre planning units proposals as presented by Deane Swickard to our department on June 28, 1978.

The proposed action was most refreshing and was by far the best BLM land management proposal we have reviewed to date. It not only recognizes wildlife considerations recommended by this department, but more importantly, provides for realistic actions to meet the major objectives of stabilizing and improving the existing ecosystems for the benefit of all resource values and users on a long-term basis.

The Nevada Department of Fish and Game heartily endorses your latest management proposals for the Cowhead/Massacre planning units and emphatically emphasizes that this proposal be the BLM's major land management proposal in the E.I.S. document.

Again, Rex, we were very pleased to see this management proposal, and we pledge our support in its implementation.

Sincerely,

GLEN K. GRIFFITH, DIRECTOR

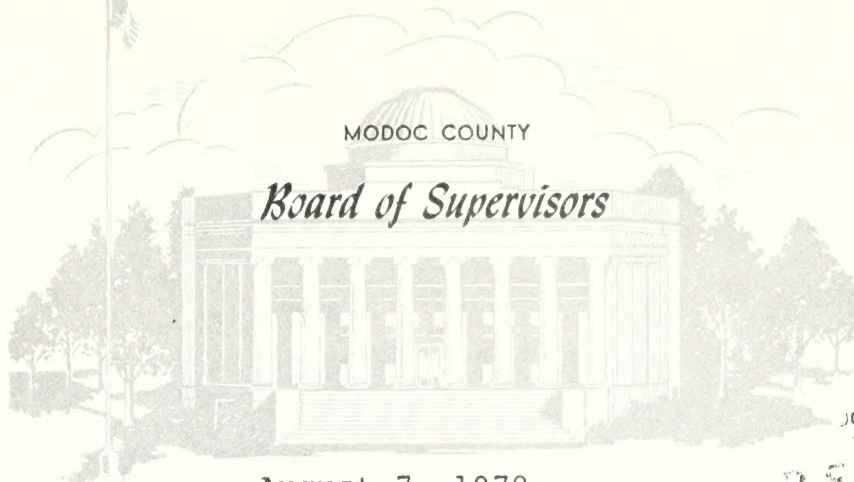
Glen C. Christensen
Chief, Game Division

GCC:VN

cc: Region I Supervisor
Deane Swickard, Surprise R.A. Manager
Edward L. Hastey, BLM Calif. State Director
Johanna Wald, N.R.D.C.
Tina Nappe, Sierra Club

JOHN B. LAXAGUE
Cedarville
MELVIN "Andy" ANDERSON
Alturas
NEAL PHILLIPS
Alturas
M. W. "Mickey" JONES
Alturas
MANUEL P. SILVA
Tulelake

County Clerk
and
Clerk of the
BOARD OF SUPERVISORS
Box 1130
ALTURAS, CALIFORNIA 96101
(916) 233-2215



August 7, 1978

Mr. Rex Cleary, District Supervisor
Bureau of Land Management
Susanville, California 96130

Dept. of Interior
RECEIVED
AUG 13 1978
BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

Dear Rex:

I have studied Chapter 1 of the Cowhead/Massacre Draft EIS and I am completely dissatisfied and personally disappointed with it. I am dissatisfied because I must reject the proposal and disappointed because I thought I was working with people I could trust.

For the past 35 years I have worked with District, State and National Grazing Advisory Boards and Multiple Use Boards. I have also spent 22 years as a Modoc County Supervisor. During this time I have been a strong supporter of BLM policy. We have always been able to work together and arrive at decisions that were mutually acceptable.

We were all hopeful that the unique approach we were taking in the preparation of this EIS would be successful. From the beginning, over six months ago, you and your people have had excellent cooperation from ranchers, other interest groups, and everyone else involved. We believed you when you said the Washington office wanted to see substantial cuts, and we also believed you when you said this was not the way, that by working together we could find another, better way.

I have no choice but to believe there was no integrity in the discussions we had and that your decision was already made while negotiations were in progress.

To re-state my position, you know as well as I that our ranchers cannot survive a 50% reduction in AUM's, and more importantly, that cuts of this magnitude are totally unnecessary. I feel the management proposal is all wrong, and I will continue to oppose it in every possible way.

Sincerely,

John B. Laxague

John B. Laxague

Dept. of Interior
RECEIVED
BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

RESOLUTION OF THE BOARD OF SUPERVISORS
OF THE COUNTY OF MODOC NO. 18-57

WHEREAS, the June 18, 1975 court order (NRDC -vs- Norton) required the Bureau of Land Management (BLM) to prepare Environmental Impact Statements (EIS) on each of 212 designated subdivision of their western grazing lands, and

WHEREAS, to date, three years later, of the few statements filed none have been approved and no implementing decisions have been made, and

WHEREAS, because of failure to obtain approval and because this same court decision created situations suggesting a need for grazing permittees to assume a greater role in planning the use of Federal range lands, the Cedarville Management Area of the Susanville BLM District approached Cowhead/Massacre permittees with a new plan to involve all interests (livestock permittees, Wilderness Society, Sierra Club, Fund for Animals, Audubon Society, National Wildlife Federation, California and Nevada Fish and Game, U.S. Fish and Wildlife Service, Nevada and California Cooperative Extension, Soil Conservation Service) in the actual preparation of an EIS for that area that would consider all conflicts and arrive at a management plan acceptable to all, and

WHEREAS, representatives of all groups involved met numerous times for long, difficult work sessions considering conflict areas and negotiating alternatives agreeable to all, and

WHEREAS, following each work session written reports of these recommendations were submitted to the Cedarville District Manager to aid in developing a management proposal for the Cowhead/Massacre Draft EIA, and

WHEREAS, during the negotiating sessions all interests agreed to delayed livestock turnout provided additional forage was made available through water development and grass plantings to provide forage during the early spring period, and

WHEREAS, it was mutually agreed that the revised management plan would be workable and acceptable only if and when this additional forage was available, and

WHEREAS, all parties involved agreed that livestock grazing was a necessary part of the resource management system and that decisions made were not to reflect drastic changes in livestock numbers, and

WHEREAS, the proposal finally submitted (Chapter 1) to Cowhead/Massacre permittees on June 28, 1978, contained only a small fraction of the seedings proposed with no guarantee that any would actually be established, recommended an average 51% reduction in AUM's, eliminate sheep and cattle from one sub-unit entirely in favor of wildlife and archaeology and in general ignored major recommendations made by the cooperating groups, and

WHEREAS, this proposal (Chapter 1) if adopted would eliminate most of the livestock grazing on the Cowhead/Massacre unit and would mean financial disaster for most producers involved, and

WHEREAS, just the proposed loss of 30,743 animal unit months (AUM's) of grazing calculates to an estimated direct loss to the county economy of \$365,277 (each AUM valued at \$11.88 - BLM estimate) and a combined direct and indirect loss of \$635,495 (1.74 multiplier), and

WHEREAS, these cuts are not based on range conditions or present or projected range carrying capacity but are obviously arbitrary reductions designed to obtain administrative approval at the expense of sound resource management, livestock production, and the economy of the county, and

WHEREAS, most resource specialists agree that range can be restored (where needed) with a properly designed and implemented prescribed grazing program without reduction in numbers.

NOW, THEREFORE, BE IT RESOLVED that the Modoc County Board of Supervisors reject the proposed BLM grazing plan (Chapter 1) for the Cowhead/Massacre grazing area and request that the BLM submit an alternative plan designed to use research techniques already available that will

improve this public land resource for all uses while maintaining present livestock numbers and season of use, and

BE IT FURTHER RESOLVED that if such a plan is submitted this Board will do everything possible to aid the BLM and all involved groups in obtaining its approval, and

BE IT FURTHER RESOLVED that copies of this resolution be sent to the following people: Rex Cleary, Supervisor, Susanville District, BLM; Dean Swickard, Area Manager, Cedarville, BLM; Ed Hastey, California State Director, BLM; Frank Gregg, National Director, BLM; Senator Alan Cranston; Senator S. I. Hayakawa; Congressman Harold T. "Bizz" Johnson; Senator Howard Cannon; Senator Paul Laxalt; and Congressman James Santini.

PASSED AND ADOPTED at a regular meeting of the Board of Supervisors of the County of Modoc held on the 7th day of August, 1978, by the following vote:

AYES: Supervisors Anderson, Laxague, Jones, Silva and Phillips

NOES: None

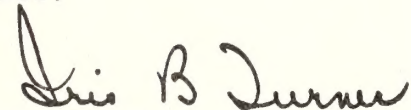
ABSENT: None

BOARD OF SUPERVISORS OF
THE COUNTY OF MODOC

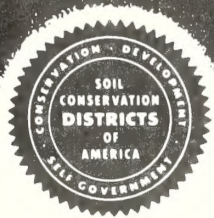
By


Chairman

ATTEST:


County Clerk and Ex-Officio Clerk
of the Board of Supervisors





Vya Soil Conservation District

P.O. Box 777 * Cedarville, California 96104 * Telephone 279-2186

September 18, 1978

Dept. of Interior
RECEIVED

SEP 21 1978

**BUREAU OF LAND
MANAGEMENT**
SUSANVILLE, CALIFORNIA

Rex Cleary, District Supervisor
Bureau of Land Management
P.O. Box 1090
Susanville, California 96130

Dear Rex:

The members of the Cowhead-Massacre Planning Committee, present at the September 6, 1978, meeting were extremely disappointed in the reaction to the guidelines which were proposed to the B.L.M. for developing a workable management plan for the Cowhead-Massacre Planning Area.

These guidelines were developed based on the efforts of the Planning Committee over the last ten months and we feel we can live with them. If the B.L.M. persists in holding to the proposed action we cannot support it as this type of planning by the B.L.M. will bankrupt Surprise Valley.

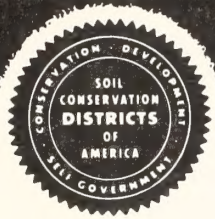
We feel adjustments in the B.L.M. time schedule must be made and a rewrite of the proposal started.

The fact that the Susanville District fell back to the normal B.L.M. planning processes, without further attempt at obtaining a coalition of the majority of the planning committee leaves us with the feeling that the staff of the B.L.M. does not have much regard for the expertise of the total membership of the planning committee. We are not adverse to more meetings of the group to develop a plan which will meet the needs of all interests. However, we want assurance that the guidelines, or acceptable revisions, we presented will be used in developing this plan.

Sincerely,

Ed Berryessa, Chairman
Cowhead-Massacre Planning Unit
Vya Conservation District

EB:pi



Vya Soil Conservation District

P.O. Box 777 * Cedarville, California 96104 * Telephone 279-2186

October 20, 1978

Rex Cleary, District Supervisor
Bureau of Land Management
P.O. Box 1090
Susanville, California 96130

Dear Rex:

Enclosed is the rancher developed alternative which you indicated would be Alternative 4 in the Cowhead-Massacre EIS.

It is our opinion that all resources and uses for the area have been considered. As stated in our supporting document we feel no editing of the Alternative is needed, therefore, any future editing is not authorized without our approval.

We request that a copy of our supporting statement accompany the EIS to all reviewers. Recognizing that your time schedule is very tight we appreciate your efforts in allowing us time to prepared this Alternative.

Sincerely,

Ed Berryessa, Chairman
Vya Conservation District
Cowhead-Massacre Resource Planning

EB:pi

Dept. of Interior
RECEIVED
OCT 24 1978
BUREAU OF LAND
MANAGEMENT
SUSANVILLE, CALIFORNIA

ALTERNATIVE 4

Monitored, Progressive Development

This alternative proposes to meet General Land Use Objectives through a program emphasizing monitoring, range improvements, and coordinated resource management plans for each allotment. Initial grazing use adjustments would be minimal.

This alternative recognizes that present knowledge of the resource area is not adequate to insure long range decisions, information on condition, trend, resource conflicts and complementary relationships is inconclusive or non-existent, thus, initial action will emphasize establishment of an effective monitoring system, selection of proven range improvement practices, and a resource management program that will stabilize the social and economic environment of the local community. Improvement of ecological conditions and protection of areas of critical environmental concern will occur naturally as this alternative is implemented.

Major elements of this alternative include:

1. To establish a baseline for progressive development, a monitoring system will be established by a team that includes B.L.M., other agencies and permittees, in each allotment for determining range trend, use patterns, and other factors. Conditions will be reviewed and evaluated in the field at least every three years by a similar team. The Cowhead-Massacre soil survey will provide the basic soil and range site (ecological site) information.
2. Major grazing adjustments would be made only after improvements are in use and vegetative and grazing effects have been carefully monitored and evaluated. No initial changes will be made in allotment boundaries, or authorized use, including permitted AUM's, turnout dates, season of use or classes of livestock. However, temporary adjustments (e.g., to meet needs of the range improvement schedule) may be worked out mutually between the permittee and bureau officials.
3. Extensive range improvements on the public lands are needed, and will include a minimum of:
 - a. 21,000 acres of shrub reduction
 - b. 21,000 acres of revegetation
 - c. 32 miles of fence construction
 - d. 1 mile of fence removed
 - e. 40 springs to be developed
 - f. 113 reservoirs to be constructed
 - g. 37 wells to be drilled and equipped
 - h. 3 miles of stock trails to be constructed
 - i. 30 cattle guards where fences cross BLM marked roads & trails

Additional improvements may be required for management of sensitive areas.

4. Coordinated resource plans will be developed for all allotments. Management systems will be designed to minimize fencing and emphasize middle to late successional stages, but will maintain a mosaic of all successional stages.

5. Wild horse numbers will be reduced and maintained at 1971 population numbers and areas.

6. High Rock Canyon will be used in such a manner as to enhance archaeological and wildlife - related resources and non-vehicle recreation. Wild horses will be excluded from the area.

7. The management of allotments with significant private lands will be determined with the participation and consent of the permittees involved.

SUPPORTING STATEMENT

ALTERNATIVE 4 - MONITORED, PROGRESSIVE DEVELOPMENT

COWHEAD-MASSACRE PLANNING UNIT

The attached Alternative 4 has been written to conform, insofar as possible, to the format developed by B.L.M. with the intent that no editing will be required by B.L.M. in preparing it for the Draft EIS. However, this format does not provide the background and rationale necessary to fully understand and evaluate the proposal. Therefore, the following statement has been prepared for the record and for the guidance of EIS writers and reviewers.

Early in 1978, following informal meetings with a variety of interests, the B.L.M. Susanville District received authorization to proceed with planning an EIS preparation on the Cowhead-Massacre Planning Area utilizing some new approaches. One of the major elements of this new approach was the early convening of a user-interagency-interest group Planning Committee to guide B.L.M. in the development of the plan. Included on the Planning Committee were representatives of the C-2-N Grazing Board, Vya and Surprise Valley Resource Conservation Districts, the Wilderness Society, the Fund for Animals, Sierra Club, Audubon Society, National Wildlife Federation, California and Nevada Fish and Game Departments, the Universities of California and Nevada, the Fish and Wildlife Service and the Soil Conservation Service.

From the beginning this approach was accepted enthusiastically by participants and followed with keen interest by those in and outside B.L.M. who were seeking better ways to prepare the Court ordered grazing EIS's. Initial meetings of the Planning Committee established improved understanding, communications and rapport among the interests represented and resulted in the development of a consensus on a number of key elements essential to land use planning and a grazing program for the area. Unfortunately, after a Planning Committee meeting in May 1978, the B.L.M. unilaterally determined to prepare its plan and begin EIS development without further consultation with the committee. The proposed action that resulted disregarded much of what had been developed by the committee and was totally unacceptable to many of the participants and to the livestock operators who would be most directly effected.

Alternative 4 has been developed primarily by the effected livestock operators with the assistance of a number of the members of the original Planning Committee. It attempts to meet the objectives and to include many of the concepts developed by the Planning Committee. It is presented to B.L.M. as an alternative with the assurance of the District Manager that it will receive equal consideration with the proposed action in the EIS analysis and in the decision making processes that will follow.

Alternative 4 proposes to meet the objectives developed by the Planning Committee through a phased-in flexible approach that emphasizes implementation of range improvements and monitoring systems in advance of any significant adjustments in livestock grazing and before coordinated resource

management plans are fully developed for each allotment.

It is believed such an approach will attain all three objectives developed by the Planning Committee within a reasonable period of time. These objectives are: (1) improvement of ecological condition, (2) protection of areas of critical environmental concern, and (3) stabilization of the social and economic environment of the local community. While the Proposed Action and the other alternatives may also meet the first two objectives, and possibly sooner than this Alternative would, this would occur only at the expense of the third objective. This would also appear to be contrary to the intent of the National Environmental Policy Act of 1970 (a significant negative effect on the "quality of the human environment"), the Federal Land Policy and Management Act of 1977 ("that management be on the basis of multiple use...." and the public lands will "be managed in a manner which recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber...") and the Taylor Grazing Act of 1934 ("to stabilize the livestock industry dependent upon the public range").

In addition, the monitored, progressive development approach will reduce changes for technical error and unnecessary expenditures and will provide for the cooperation necessary for any public program to be effective. In short, it is believed that the objectives of the plan can be met with less disruption to the public rangelands, the users and the local community and at less public expense than is suggested by the Proposed Action or any of the other alternatives.

1. MONITORING SYSTEMS. This is the key to the effectiveness of the program. The systems should be established utilizing the best scientific and technical information and methodology available and should provide useable and valid information on all phases of multiple-use management for the users as well as the agency decision makers. It is important that the monitoring system be planned, "read" and evaluated by a knowledgeable team that includes not only B.L.M. personnel but also ranchers and representatives of other interested organizations. Since soil and range site (ecological site) information is available for the planning units in the Cowhead-Massacre soil survey, it should be used as the basis of the monitoring program. Management systems will be designed to emphasize middle to late successional stages but will maintain a mosaic of all successional stages. Plant species selected for special consideration in management evaluation will be plants from among those commonly found within the allotment. Relatively uncommon but important plants found only on limited areas or in limited amounts within the allotment will be evaluated and considered separately in management programs.

2. NO INITIAL CHANGES WILL BE MADE IN ALLOTMENT BOUNDARIES OR AUTHORIZED USE. Such changes are premature and would be extremely disruptive to existing management programs. Existing data on condition, trend, grazing capacity and utilization are inconclusive or non-existent. Reductions in AUM's, changes in season of use, turn-out dates and exclusion of sheep as proposed would have serious negative impacts on many operators as well as on inter-dependent private lands. There is nothing to indicate conditions so serious

that major and immediate reductions are necessary. Therefore, adjustments should be considered only after adequate alternatives have been field tested and sound monitoring systems clearly indicate change is necessary. Temporary adjustments may be necessary to meet special conditions (example: rest following revegetation). This can be worked out through agreement by the permittee and the Bureau.

B.L.M. proposes that the present 43 allotments be combined into 10 management areas. If Chapter 1 is implemented these 10 management areas will become allotments and the old allotment boundaries will be abandoned. Allotment boundaries that have existed for many years will be maintained. They are recognized by the ranchers and their livestock and were developed in response to a variety of practical and environmental considerations. Changes should be made only as part of a coordinated resource management plan developed cooperatively over time. There are several types of livestock operations using the Cowhead-Massacre units: cow-calf, stocker, registered herds, sheep, etc. Many of the ranchers move on to other grazing acres in the Sheldon Antelope Refuge and Range or the Modoc National Forest. Combination of these various operations would require thousands of livestock to be unnecessarily sorted and frequently moved. Excessive handling of large numbers of livestock also disturbs wildlife and trampling causes damage to areas where livestock are worked and concentrated.

3. THE RANGE IMPROVEMENTS LIST presented in the alternative has been developed by the individual rancher-licensees and is based on their knowledge of needs, capabilities and constraints. It is probably a much more realistic list than is provided with the Proposed Action or any of the other Alternatives. All proposals are sound, locally proven practices for improving range productivity and securing proper distribution for all animals.

Shrub reduction and revegetation are recognized as the only means to restore nonproductive, ecologically stagnant sagebrush sites for improved watershed, habitat and forage. Priority should be given to methods and species that have been proven technically and economically, even though the direct benefits may accrue primarily to livestock. Other values and uses will benefit indirectly at least equally through reduced grazing pressure in adjacent areas. This is especially true in this region since early spring use has been identified as a critical period on both public and private lands. Revegetation technology is presently capable of mitigating this problem.

4. COORDINATED RESOURCE MANAGEMENT PLANS. Approximately 29% (315,000 acres) of the planning area is in private ownership. Much more significant than the percentage is the nature of that land. Most of the water (more than 90%), meadows, riparian habitat and sensitive areas are currently in private ownership. In fact, it is often the private land rather than the public land that holds the key to successful wildlife management programs. The success of any management scheme is directly and vitally dependent on the use and development of these private lands owned by the rancher permittees. Coordinated resource plans must be made with the owners of the private lands for the orderly development of both the public and private lands. Grazing systems will be tailored to the particular needs of each

allotment; one management scheme will not be forced on all allotments.

Key elements of the coordinated management plans should be a minimum of fencing to reduce costs and conflicts with wildlife, wild horses and recreationists and (2) systems of grazing that will emphasize middle to late successional stages but maintain a mosaic of all successional stages. Both of these concepts were considered very important to the Planning Committee. Most of all, the plans must provide flexibility to meet climatic variability, economic fluctuations, changing resource values and to adjust to new technology and new information gained from the monitoring program.

5. WILD HORSES TO BE REDUCED AND MANAGED AT 1971 LEVELS. Substantial increases in wild horse numbers since 1971 have seriously taxed the range resource and conflict with use by wildlife and livestock. Livestock numbers have already been substantially reduced. Healthy horse populations can be managed in a multiple use context at about 1971 levels. They cannot be managed at present excessive levels.

6. The Planning Committee is in complete accordance with the multiple use concept as stated in the Organic Act of 1976 under which B.L.M. operates. However, the committee disagrees with the B.L.M. concept of multiple use as it is used in Chapter 1. B.L.M. has designated large areas to be managed for a dominant use; e.g., the priority of uses in sub-unit 1 (High Rock) is wilderness, preservation of archaeological sites, and wildlife habitat with the exclusion of livestock grazing. The committee's interpretation of multiple use is that all uses will be integrated into the management of the planning units and allotments; priority of uses will not be imposed on such areas as has been done by the B.L.M. Dominant use, however, will be given to specifically assigned areas within allotments and planning units such as archaeological sites, antelope kidding grounds, sagehen strutting grounds, riparian habitat, etc. The remainder of the areas will be managed for all uses with no one use dominating any of the others. The Planning Committee feels that this interpretation of multiple use is more in keeping with Section 103 (C) of the Federal Land Policy and Management Act of 1976, (Organic Act).

MANAGEMENT AREAS	Mosquito	CALCUTTA	BOARD CORRAL	LITTLE VALLEY	NEVADA COLOR
of water ILITIES TO BE DEVELOPED	5-Reservoirs 1-Spring Development 1-Trough 1-1/2 miles - Pipe	3-Reservoirs 1-Lake dug out 1-Spring Development 4-Reservoirs Repaired	1-Windmill	1-Reservoir 1-Repair Reservoir	2-Horizontal Weir 5-Reservoirs 1-Spring Develop
es of Fence To Be ded or REMOVED		9 miles fence			Remove 1 mile Fe Add 1 mile fence
NO TREATMENTS RAYING OR BURNING)	3840 Burning	1280-ACRES seeding 3840 Acres spray			existing seeding should be sprayed for brush

MANAGEMENT AREAS	NEVADA COWHEAD	NORTH COWHEAD	EAST	Holy	SEAMAN
of WATER ILITIES TO BE DEVELOPED	3-Reservoirs 1-Repair Reservoir 1-Dam 100 acres	2-Reservoirs 2-Repaired Reservoir	1-Reservoir		
es of Fence To Removed or Added					
NO TREATMENTS RAYING OR BURNING)	Company cleared area 3-4000 acres spot spray 1000 acres stock trail away from water		Reservoirs sprayed	200 AC Burn	800 acres jump and brush comb

NO CHANGE

TO BE DETERMINED WHEN RANGE IMPROVEMENTS ARE COMPLETE

Reason of Use	Little High Rock	Massacre Mountain	Wall Canyon	Long Valley	Sand Creek
Vegetation	"	"	"	"	"
MANAGEMENT AREAS					
of Water	2-SPRING developments	9-TRAILS Repaired	11-SPRING Developed	7- Wind mills	11- Reservoirs
CILITIES TO BE	5-RESERVOIRS	1- RESERVOIR	4-HORIZONTAL WELLS	2-SPRING DEVELOPMENT	7- Repair Reservoirs
DEVELOPED		1- Spring Development	7-RESERVOIRS	4- RESERVOIRS	2- Wells
es of Fence to			2- Wells		2- Handmill
Added or			3- Reservoirs Repaired		2- Repair Windmills
Removed				3 1/2 miles Fence - 1	2- Repair Pipeline
TREATMENTS					
SPRAYING & BURNING		3200 AC SPRAYED		1000 AC SPRAYED	2560 AC SEEDING

MANAGEMENT AREAS	40 MOUNTAIN	NUT MOUNTAIN	MAGGARE LAKE	LITTLE BASIN	BOGGS BASIN
3. of Water ACILITIES TO BE DEVELOPED		4- WINDMILLS 9- RESERVOIRS 11- Repair Reservoirs 9- DAMS IN CREEKS 5- SPRING improvements 3 miles Pipe 12 Miles - A	4- Spring Developments 2- Reservoirs 1- Repair Reservoir 1- Horizontal Well	5- Reservoirs 3- Windmills 1- Spring Development 1- Repair Reservoir Repair Dam on WATER AT AUG 1	2- Windmills 2- Windmills 1- Repair Windmill 3- Repair Reservoir Repair Dam on WATER AT AUG 1
Miles of Fence To Be Added or Removed					
AND TREATMENTS (SPRAYING OR BURNING) Seeding		5120 AC Seeding	6910 AC Seeding		1000 ACRES SPI

MANAGEMENT AREAS	UPPER SAND CREEK	UPPER LAKE	NORTH LARKSPUR	SOUTH LARKSPUR	CROOKS LAKE
3. of Water ACILITIES TO BE DEVELOPED		4 Spring developments	1- Reservoir 1- Repair Windmill	2- Reservoirs 1- Windmill or Reservoir 1- Spring Dam	1- Spring Dam 2- Reservoirs
Miles of Fence To Be Removed or Added					3/4-1 mile Fence
AND TREATMENTS (SPRAYING OR BURNING) Seeding		200 ACRES Seeding	1000 ACRES Seeding		

BLM Decision In Modoc Area EIS Due Soon

FACTORS — Although a "formal rendering" of decisions by the Bureau of Land Management is not expected until late this month, a draft of the decision document calls for "pretty drastic cuts" in livestock grazing, particularly for the first year.

Cecil Pierce, Modoc County farm advisor and secretary of the Modoc County Cattlemen's Association, said the draft document calls for a "drastic reduction in livestock grazing — about 33 percent — the first year" the plan is in force on the Tulead-Homestead unit in Surprise Valley as the BLM moves to a rest-rotation system in grazing.

He said it is assumed these AUMs (Animal Unit Months) would be restored in succeeding years; however, "it appears that whether or not they are restored depends on a lot of things, including the monitoring system."

Pierce said his quick perusal of the document indicates the "critical thing" will be "how and where BLM sets up monitors" to measure range rehabilitation.

"If they continue to be placed close to waterholes, then it won't be possible to see any improvement in range conditions even with the reduction in cattle numbers," Pierce said. If moved away from waterholes, then the range would show a response.

The Tulead-Homestead unit is one of two areas in Surprise Valley which are subject of BLM Environmental Impact Statements and which have resulted in considerable controversy in recent months. The second unit, the Cowhead-Massacre unit, has been evaluated, BLM has made its initial report, cattlemen have offered an alternative and no word has been received as to whether their alternative has been accepted.

The Tulead-Homestead plan has been approved by the state BLM director and been circulated for comment.

Pierce said excerpts have been sent to ranchers involved and copies of the total text have been given to five environmental groups and himself for analysis.

If accepted in Washington, the plan would be part of the BLM's management program it hopes to institute on each grazing permit in the planning unit.

The Washington office is

expected to review the Tulead-Homestead document and render a final decision in late January.

A draft EIS on the Cowhead-Massacre unit is expected to be available in February, following which there will be a 60-day comment period with the final document due possibly in April.

Cattlemen's alternative to the Cowhead-Massacre plan was developed after BLM announced plans in September to reduce cattle numbers by at least half on the 1,094,000 acres, both private and government, in the Northeast California-Northwest Nevada area.

BLM has indicated alternatives must be those of that agency; hence, changes may be necessary to maintain consistency with BLM format and data used.

Klamath Herald & News

Jan. 2, 1979

Klamath Falls, Oregon

List of PREPARERS

LIST OF PREPARERS

Marc Duncan: Planning/Environmental Coordinator, Susanville District Office

Ted Milesnick: Range Conservationist, Susanville District Office

Steve Hawks: Wildlife Biologist, Susanville District Office

Mike Ferguson: Wildlife Biologist, Surprise Resource Area

Chris Corson: Archaeologist, Susanville District Office

Stan Bales: Outdoor Recreation Planner, Susanville District Office

Paul Zwerman: Soil Scientist, Susanville District Office

Dave Lambert: Economist, Susanville District Office

Deane Swickard: Area Manager, Surprise Resource Area

Sue Grobman: Writer/Editor, California State Office

H. F. Cooper: Range Conservationist, Surprise Resource Area

Roger Farschon: Range Conservationist, Surprise Resource Area

Gary Schoolcraft: Botanist, Susanville District Office

Russ Elam: Wilderness Specialist, Susanville District Office

Bureau of Land Management
Library
Bldg. 50, Denver Federal Center
Denver, CO 80225

BORROWER'S CARD

C68 1980b

imental

BORROWER	OFFICE	DATE RETURNED

(Continued on reverse)

